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as

Mrs. Pollock.

PLANT MATERIALS

OF

DECORATIVE GARDENING

THE WOODY PLANTS

BY

WILLIAM TRELEASE

PROFESSOR OF BOTANY IN THE UNIVERSITY OF ILLINOIS

URBANA

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William Trelease

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INTRODUCTION.

It has become the practice of gardeners to speak of the plants used for decorative purposes as the plant materials of their art. These materials fall rather naturally into three classes: the woody plants used in landscape architecture and street planting, the herbs used for bedding and border planting, pools, etc., and the grasses of lawns.

The present little volume is an attempt to make it possible for any careful observer to learn the generic and usually the specific name of any hardy tree, shrub or woody climber that he is likely to find cultivated in the eastern United States—apart from the extreme south—or in northern Europe, anywhere except on the more pretentious estates, or in nurseries or botanical establishments. It accounts for 247 genera and 782 species, with some 375 minor forms, or over 1150 distinct kinds. These pertain to 83 natural families.

For a few hopelessly complicated genera, such as the haws, cotoneasters, mockoranges and roses, only a few of the most easily recognized species have been admitted. Except for these, an effort has been made to include all but the rarer or newer species. By way of compensation for omissions, the common trees and shrubs of the orchard may be traced to their species, and also the commoner native shrubs and cover plants.

It is assumed that the terms usually applied to the parts of plants are understood or will be looked up in the glossary by anyone who wishes to use the keys, and that he will quickly learn to make a small and not necessarily expensive pocket lens of about twelve-diameter magnification his inseparable companion and helper: no further equipment is necessary except a good store of care, patient interest, and common sense.

To keep the book inexpensive, and of a size to fit the pocket, identifications are provided for in concise keys. As a rule these

should lead to reasonably certain conclusions: but no key in itself is to be regarded as final, and determinations should be checked up by reference to Bailey's Standard Cyclopedia of Horticulture, in which are to be found full descriptions and references to excellent illustrations. To facilitate this use, technical considerations are waived and the names here used for genera and species are conformed to the Cyclopedia: but where native genera are differently named in currently used Manuals, these names are added as synonyms.

The keys do not bring together the names of genera that are related; but their division into sections dealing respectively with Trees, Shrubs, Undershrubs and Cover Plants, and Climbers, gives them a certain comparative value in addition to convenience of reference; and this is increased by the grouping in various places of evergreen and deciduous, armed and spineless forms, etc., and by a division of the undershrubs according to their habit of growth.

The relationships of the genera and the relative landscape or other importance of families are to be seen at a glance when reference is made to the systematic part of the book. An innovation that it is hoped may prove useful, and that affords suggestions for further observation on dependable though rarely-used characters, is to be found in the brief descriptions of the genera, in which more space is given to wood, bud, leaf-scar, foliage and inflorescence than to the more transient details of flower and fruit on which botanical classification largely rests.

Though the manuscript has been subjected to critical use by individuals and classes, it is probable that errors have been overlooked, or introduced in the effort to make betterments. For these, apologies are tendered; but the hope is entertained that its shortcomings may be outweighed by a general usefulness of the little handbook, which is intended to meet a need that my own experience as a teacher shows to be very real now that plant materials are so much studied and used.

Urbana, Illinois, June 30, 1917.

USING THE KEYS.

The determination keys are essentially "dichotomous." At each point it is necessary to decide between two—rarely three or four—very distinctly contrasted characters, and in each case these contrasts are grouped under a single number in the key. The first few choices are between differences that can be seen without touching the plant. Since poison ivy, poison oak and poison sumach are very poisonous to the touch, it is advisable to have the first two, which are common everywhere, pointed out by someone who knows them, and to regard anything with compound leaves as suspicious until these three are well known. A few examples will show the simplicity of using a key, and the directness with which it leads to the name of a plant.

Wishing to become acquainted with one of the poisonous species as quickly as possible, I go to a "vine"-covered fence-post and without touching the plant am able to see readily that it is thin-leaved, therefore probably deciduous; with one leaf at a node, the leaves therefore alternate; and that each leaf is compound,—made up of three rather large wavy-margined leaflets coming from the end of the leaf-stalk, and therefore digitate, or palmate. Turning to the Synopsis of Groups (p. 10), I find that it is to be sought in Key D on p. 38. In this key, beginning —as always— with no. 1, the characters that I have seen already take me through the key by the following references:— no. 1, to 7; no. 7, to 10; no. 10, to 11; no. 11, to 23,— with a caution that this group contains poisonous species; no. 23 compels me to look at the plant a little more closely, still without touching it, and I see that it does not support itself by coiling about the post, and that it has no tendrils though it has fastened itself by short roots coming from between the nodes. The conclusion is inevitable that it belongs to the genus *Rhus*. In the key to species of this genus (p. 117), I find, under no. 1,

that there are three species with only 3 leaflets to each of the compound leaves; although the characteristic white fruit may not be in evidence, my observation that it is a climber, leading through the sequence 1 to 2; 2 to 3, satisfies me that I have seen the poison ivy, *Rhus radicans*, in one of its protean forms. Later I may chance to find it in the grass. In this guise, I should trace it through Key C (p. 34) as an underbrush, coming to the same result by the steps 1 to 15; 15 to 38; 38 to 39; 39 to 54; 54 to 55. In its bushy southern form, and with more lobed leaves, I should trace the scarcely separable poison oak, *R. Toxicodendron*, through Key B (p. 19) by the steps 1 to 33; 33 to 61; 61 to 62; 62 to 149; 149 to 150; 150 to 151, where I get a cautionary signal; 151 to 152. In addition to learning this dangerous plant, I may have satisfied myself incidentally that the harmless Virginia creeper can be distinguished from it by having 5 leaflets in each leaf, and by climbing by tendrils opposite the leaves.

An entomologist comes to me with a branch of a tree badly infested with scale insects. He thinks that he knows the tree, but wishes to be sure of it because the owner and his neighbors can not say what it is. The Synopsis of Groups leads me to Key A (p. 11). It is obviously deciduous, not at all prickly or spiny, with rounded twigs, opposite leaves that are rather large and pinnately compound with five or seven somewhat toothed short-stalked leaflets, green on both sides. Through Key A, I go by the successive steps 1 to 26; 26 to 39; 39 to 104; 104 to 112. Here I cut the twig cleanly across midway between two nodes and find that the pith is of moderate diameter as compared with elder-pith; and the succeeding steps are 112 to 113, and 113 to 114, where I find that the scars from which last year's leaves have fallen are squared off below this year's twigs or any undeveloped buds of last season, so that I am convinced that it is a *Fraxinus*. In the key to the species of ash (p. 158) I go successively from 1 to 2; 2 to 3; 3 to 11; 11 to 12; 12 to 14, where I find it to be *Fraxinus lanceolata*. Reference to the Cyclopedia gives fuller information about the tree.

Under some shrubbery, I see very often a trailing little evergreen with lanceolate or elliptical entire simple leaves, two at a node (opposite); and its single large blue flowers attract attention early in the spring. The Synopsis of Groups refers me to Key C (p. 34) where, by the successive steps 1 to 15, 15 to 38, 38 to 39, 39 to 40, 40 to 42, 42 to 49, 49 to 50, 50 to 51, I reach the conclusion that it is a *Vinca*. Reference to the account of this genus (p. 165) shows that it is the periwinkle or running "myrtle," *Vinca minor*.

Of late years a gigantic twiner, woody only at base, has come into extensive use. Its alternate compound leaves with three large lobed leaflets enable me to trace it through Key D (p. 38), by the steps 1 to 7, 7 to 10, 10 to 11, 11 to 23, 23 to 26, and 26 to 27, where I see that it is a *Pueraria*, and reference to p. 111 shows that it is the Kudzu vine, *P. hirsuta*.

Finally, to take a more complicated case, I gather a shoot of a very slender and graceful deciduous shrub under my window and note that it has alternate 5-ranked simple but somewhat lobed glabrous rather pointed leaves, with a single C-shaped woody bundle showing when I snap the leaf-stalk off at its base; and the partly ripened fruits, earlier a mass of small white flowers, clustered on short twigs, consist of several small seed-like "akenes" in each persistent calyx. The Synopsis of Groups refers me to Key B (p. 19) where I trace it from 1 to 33; 33 to 61; 61 to 62; 62 to 63; 63 to 65; 65 to 66; 66 to 139; 139 to 141; 141 to 142; 142 to 143; 143 to 147; 147 to 148; where I conclude that it is a *Spiraea*. In the key to species of this genus (p. 89) I follow it from 1 to 8; 8 to 10; and 10 to 11, where I am satisfied that it is the now very popular betterment of the "bridal wreath," × *S. Vanhouttei*. The Cyclopedia tells me that this is a hybrid of its fore-runner, *S. trilobata*, with *S. cantoniensis*, and incidentally I learn something of the number of species of this attractive genus that the larger collections may include, and of their scientific classification.

SYNOPSIS OF GROUPS.

Trees, as usually grown, for groves, avenues and specimens. Key A. (p. 11).

Bushes, as usually grown, for blocking-out, shrubberies, specimens and hedges,—including such small trees as sumach and trees that are cut back in hedges or for the bright color of their young shoots in winter. Dwarfed evergreens are to be sought in the preceding key. Key B (p. 19).

Small undershrubs, as well as carpeting plants, and tufted evergreens used for covering rock-work, etc. Key C (p. 34).

Woody climbers and scrambling plants used on walls, pergolas, etc., and occasionally for covering rock-work. Key D (p. 38).

A. USUALLY SEEN AS TREES.

1. Evergreen: unarmed except as the simple leaves may be pungently pointed or toothed. 2.
Deciduous. 26.

Evergreen Trees—Unarmed.

2. Foliage ("phylloid shoots") needle-like, in terminal whorls on short spurs sheathed with scales. 3.
Leaves not in scale-sheathed clusters. 4.
3. Needles 1-5, angular, in a rather erect cluster. Pinus.
Needles numerous, flat in a spreading tuft. Sciadopitys.
4. Leaves alternate or clustered. 5.
Leaves opposite, small or very narrow. 18.
Leaves whorled, 3 at a node. Juniperus.

Leaves alternate.

5. Leaves small or very narrow. 6.
Leaves relatively large or broad. 15.
6. Leaves 4-sided. 7.
Leaves not 4-sided, or if so neither clustered nor from raised bases. 9.
7. Leaves often clustered on short spurs. Cedrus.
Leaves not clustered on spurs. 8.
8. Leaves green, not disarticulating, 4-ranked. Cryptomeria.
Leaves white-lined or glaucous, disarticulating from angular bases. Picea.
9. Leaves green on both sides. 10.
Leaves white-lined beneath. 11.
10. Fruit fleshy: leaves elongated, narrowed at base. Taxus.
Fruit a cone: leaves short and sharp, sessile. Sequoia.
11. Leaves decurrent in ridges on the twigs. 12.
Leaves not or little decurrent. 14.
12. Leaves mostly serrulate above: fruit a small cone. Tsuga.
Leaves entire. 13.

13. Leaves sessile, 4-ranked: fruit a cone. Sequoia.
Leaves elongated, short-stalked: fruit fleshy. Torreya.
14. Leaf-scars not at all raised: buds resinous. Abies.
Leaf-scars slightly raised: buds not resinous. Pseudotsuga.
15. Stipule-scars encircling the twig. Magnolia.
Stipule-scars not encircling the twig. 16.
16. Leaves glaucous beneath. Persea.
Leaves not glaucous. 17.
17. Leaves with nectar-glands beneath. Prunus.
Leaves without nectar-glands, usually pungent. Ilex.

Leaves opposite.

18. Leaves spreading (juvenile forms). 19.
Leaves closely appressed. 20.
19. Leaves very stiff: fruit a cone. Sequoia.
Leaves stiff: fruit berry-like. Juniperus.
Leaves flexible. Chamaecyparis or Thuja ("Retinispora").
20. Internodes not flattened: leaves alike. 21.
Internodes flattened: leaves on the side flat, those on the edges deeply V-grooved. 23.
21. Foliage-sprays not fan-like: fruit fleshy. Juniperus.
Foliage-sprays fan-like: fruit a cone. 22.
22. Seeds 2-3 under each cone-scale. Chamaecyparis.
Seeds numerous under each scale. Cupressus.
23. Internodes distinctly longer than broad. Libocedrus.
Internodes about as long as broad. 24.
24. Foliage-sprays slightly fan-shaped: internodes narrow (1-1.5 mm.). Chamaecyparis.
Foliage-sprays distinctly fan-like. 25.
25. Internodes moderate (2-4 mm.): seeds 2. Thuja.
Internodes broad (4-8 mm.): seeds numerous. Thujopsis.
26. Armed with at least some spines or prickles. 27.
Unarmed. 39.

Deciduous Trees—Armed.

27. Leaves alternate, never 4-ranked. 28.
Leaves opposite. 38.

Leaves alternate.

28. With prickles. 29.
With thorns occupying the place of stipules. 31.
With pungent twigs or spurs. 33.

29. Leaves digitately lobed or digitate. Acanthopanax.
Leaves once pinnate. 30.
Leaves bipinnate. Aralia.

30. Armed only when young. Ailanthus.
Older branches armed. Zanthoxylum.

31. Leaves pinnately compound: thorns detachable. Robinia.
Leaves simple: thorns firm. 32.

32. Glabrous: fruit dry, winged. Paliurus.
Pubescent: fruit fleshy, drupe-like. Zizyphus.

33. Leaves simple. 34.
Leaves unequally pinnate or bipinnate. Gleditsia.

34. With silvery or brown peltate scales. Elaeagnus.
Not scurfy. 35.

35. Sap milky: fruit like a great mulberry. Maclura.
Sap not milky. 36.

36. Leaves with nectar-glands on petiole or base. Prunus.
Leaves without nectar-glands. 37.

37. Pome with papery core: bud scales thin. Pyrus.
Core of fruit bony: bud-scales fleshy. Crataegus.

Leaves opposite.

38. With silvery or brown peltate scales. Shepherdia.
Not scurfy: spine short, terminal. Rhamnus.

Deciduous Trees—Unarmed.

39. Leaves alternate or clustered on alternate spurs. 40.
Leaves opposite, or 4-ranked if separated. 104.
Leaves whorled, 3 at a node, large. Catalpa.

Leaves alternate.

40. Leaves small and very narrow: fruit a cone. 41.
Leaves comparatively large: fruit not a cone. 43.

Simple.

41. Leaves on slender deciduous twigs. Taxodium.
Leaves clustered on short stout spurs. 42.
42. Scales of cone persistent. Larix.
Scales of cone deciduous. Pseudolarix.
43. Leaves fan-shaped, veined from the base. Ginkgo.
Leaves not fan-shaped, netted veined. 44.
44. Leaves simple. 45.
Leaves compound. 88.
45. Stipule-scars encircling the twigs: buds not sharp. 46.
Stipule-scars short, or else buds pungent. 49.
46. Leaves entire: sap not milky. Magnolia.
Leaves lobed. 47.
47. Buds flattened or 2-edged: sap not milky.. Liriodendron.
Buds not flattened. 48.
48. Sap not milky: buds fluted. Platanus.
Sap milky: buds not fluted. Ficus.
49. Buds with a single scale, in front. Salix.
Buds naked or with several scales. 50.
50. Buds fusiform, hard, very long and spreading. Fagus.
Buds not long and spreading. 51.
51. Mucilaginous and aromatic: twigs green. Sassafras.
Silvery- or brown-scurfy. Elaeagnus.
Not scurfy or very mucilaginous. 52.
52. Leaves 2-ranked, at least on spreading branches. 53.
Leaves in more than 2 ranks. 67.
53. Leaves palmately nerved. 54.
Leaves pinnately veined. 58.
54. Sap milky: hairs not star-shaped. 55.
Sap neither milky nor flowing freely. 56.
55. Twigs and leaves hairy. Broussonetia.
At most downy or velvety or rough. Morus.
56. Twigs moderate: pith continuous. 57.
Twigs very slender: pith often chambered. Celtis.
57. Leaves entire, glabrate. Cercis.
Leaves serrate: sometimes with stellate hairs. Tilia.

58. Pith chambered: fruit fleshy: calyx large. Diospyros.
Pith continuous. 59.
59. Buds naked. Rhamnus.
Buds scaly. 60.
60. Bud-scales several, 2-ranked. 61.
Bud-scales in more than 2 ranks. 62.
61. Fruits thin and winged. Ulmus.
Fruit not winged, tuberculate: leaves small. Planera.
62. End-bud present. 63.
End-bud often absent: pith 5-sided: twigs stout. Castanea.
End-bud always absent: twigs slender. 64
63. Buds elongated: pith 5-sided: fruit berry-like. Amelanchier.
Buds short: pith 3-sided: fruit dry. Betula.
64. Bud-scales striate. 65.
Bud-scales not striate. 66.
65. Bark rough: fruit hop-like. Ostrya.
Bark cherry-like or white or papery. Betula.
66. Fruit ribbed, with hastate bract. Carpinus.
Fruit not ribbed: leaves rough. Zelkova.
67. Pith rather large, or star-shaped. 68.
Pith not star-shaped, or if so, buds stalked. 70.
68. Buds with lower scales at the side. 69.
Buds often gummy, with lowest scale in front. Populus.
69. Leaves entire or pinnately lobed. Quercus.
Leaves palmately lobed. Liquidambar.
70. Buds stalked, or developing the first season. 71.
Buds not stalked. 72.
71. Leaves palmately lobed. Liquidambar.
Leaves pinnately toothed or lobed. Alnus.
72. Leaves with nectar-glands at base or on petiole. 73.
Leaves without nectar-glands. 75.
73. Twigs green or red: leaves drooping. Prunus (Amygdalus).
Twigs duller. 74.
74. Leaves rounded: fruit nearly sessile. Prunus (Armeniaca)
Leaves rather lanceolate: flowers stalked. Prunus.
75. Pith chambered. 76.
Pith continuous. 78

76. Leaves thin, flat. 77.
Leaves firm, revolute: fruit fleshy. Symplocos
77. Fruit dry, winged. Halesia.
Fruit fleshy. Diospyros.
78. Buds naked. Rhamnus.
Buds scaly. 79.
79. Leaves not lobed. 80.
Leaves lobed. 87.
80. Leaves very woolly beneath, entire. Cydonia.
Leaves not woolly, or if so, toothed. 81.
81. Leaves firm and glossy. 82.
Leaves thin and dull. 83.
82. Pith with firmer plates. Nyssa.
Pith without firmer diaphragms. Oxydendrum.
83. Leaves whitened beneath. Cornus.
Leaves not whitened unless by tomentum. 84.
84. Without end-bud. Prunus.
With a terminal bud. 85.
85. Buds elongated. 86.
Buds short. Pyrus.
86. Buds woolly. Sorbus.
Buds not woolly. Amelanchier.
87. Leaves pinnately lobed. Sorbus.
Leaves palmately lobed. Liquidambar.

Compound.

88. Leaves only once compound. 89.
Leaves often or always bipinnate. 103.
89. Leaflets 3, close together. Laburnum
Leaflets several, distinctly pinnate. 90.
90. Twigs stout, with large continuous colored pith. 91.
Twigs moderate, or pith chambered or pale. 93.
91. Leaves with nectar glands: end-bud deciduous. Ailanthus.
Leaves not gland-bearing. 92.
92. End-bud present. Cedrela.
End-bud absent. Gleditsia.
93. Pith chambered, with thin brown plates. 94.
Pith continuous or at most occasionally fissured. 95.

94. Buds solitary. Pterocarya.
Buds superposed. Juglans.
95. Buds concealed by a membrane after leaf-fall. Robinia.
Buds quickly exposed. 96.
96. Leaf-scar nearly encircling the bud. 97.
Leaf-scar not surrounding the bud. 98.
97. Leaflets small (2 × 4 cm.). Sophora.
Leaflets large (often 5 × 10 cm.). Cladrastis.
98. Leaf-scars large, shield-shaped: buds superposed. 99.
Leaf-scars narrow or small. 100.
99. End-bud present: buds ovoid. Carya.
End-bud deciduous: buds half-round. Sapindus.
100. Leaflets coarsely toothed and lobed. Koelreuteria.
Leaflets only toothed. 101.
Leaflets entire. Cladrastis (Maackia).
101. Leaves abruptly pinnate: buds very small. Gleditsia.
Leaves odd-pinnate: buds rather large. Sorbus.
102. Leaflets entire or slightly crenate or serrate. 103.
Leaflets distinctly serrate: buds hairy. Melia.
103. Twigs moderate: pith small. Gleditsia.
Twigs stout: pith large, chocolate colored. Gymnocladus.

Leaves opposite.

104. Leaves simple. 105.
Leaves pinnately compound. 112.
Leaves palmately compound. Aesculus.

Simple.

105. Leaves not uniformly lobed. 106.
Leaves regularly palmately lobed. Acer.
106. Leaves very large, cordate: sap not milky. Paulownia.
Leaves not very large. 107.
107. Leaves round-cordate, often separated. Cercidiphyllum.
Leaves not heart-shaped. 108.
108. Leaves all in opposite pairs. 109.
Leaves often alternate, or else sap milky. 110.
109. Leaf-scars small: leaves with twinned hairs. Cornus.
Leaf-scars large: without twinned hairs. Fraxinus.

110. Flowers showy. — Lagerstroemia.
Flowers in catkins. 111.
111. Sap milky: leaves broad. — Broussonetia.
Sap not milky: leaves rather narrow. — Salix.
Compound.
112. Pith large: fruit a small berry. — Sambucus.
Pith moderate. 113.
113. Leaflets at most finely toothed. 114.
Leaflets often coarsely toothed or lobed. — Acer (Negundo).
114. Leaf-scars encircling the buds. — Phellodendron.
Leaf-scars not encircling the buds. — Fraxinus.

B. USUALLY SEEN AS SHRUBS.

1. Evergreen. 2.
   Deciduous. 33.
2. Spiny. 3.
   Unarmed or the leaves pointed or toothed. 4

Evergreen Shrubs—Armed.

3. Leaves simple. Pyracantha.
   Leaves compound, of 3 leaflets. Triphasia.

Evergreen Shrubs—Unarmed.

4. Leaves alternate or in alternate clusters. 5.
   Leaves opposite, or separated in 4 ranks. 24.
   Leaves whorled, 3 at a node. 31.

Leaves alternate.

5. Leaves simple. 6.
   Leaves compound, pungently toothed. Mahonia.
6. Stipule-scars encircling the twig. Magnolia.
   Stipule-scars not encircling the twig. 7.
7. Leaves with minute resin-glands. 8.
   Leaves not resinous-dotted. 9.
8. Leaves toothed. Myrica.
   Leaves ciliate. Andromeda.
9. Leaves essentially entire. 10.
   Leaves evidently toothed or crenate. 21.
10. Leaves small (scarcely 25 mm. long). 11.
    Leaves finally distinctly larger. 12.
11. Leaves flat: bark rather fleshy. Daphne.
    Leaves thick, glabrous: bark thin. Cliftonia.
    Leaves revolute, rather woolly beneath. Cotoneaster.
12. Twigs slender. 13.
    Twigs stout: leaves crowded above. Rhododendron.
13. Leaves rather thin, flat, ciliate. Rhododendron (Azalea).
    Leaves firm, not ciliate. 14.

14. Leaves with translucent glands. Skimmia.
Leaves not pellucid-dotted. 15.
15. Leaves with submarginal nerves below. Pieris.
Leaves not at all 3-nerved. 16.
16. Leaves nearly flat. 17.
Leaves revolute.
Scurfy below. Lyonia.
Not scurfy. Kalmia.
17. Bark thin. 18.
Bark rather fleshy: flowers not in racemes. Daphne.
18. Leaves thick. 19.
Leaves thin, very veiny. Cyrilla.
19. Flowers and dry fruit in racemes. 20.
Flowers and red or yellow fleshy fruit axillary. Ilex.
20. Leaves very veiny, black-dotted beneath. Pieris.
Leaves not veiny or dotted. Cliftonia.
21. Leaves not closely serrate. Ilex.
Leaves closely serrate. 22.
22. Leaves appressed-hairy: flowers in racemes. Leucothöe.
Leaves glabrous. 23.
23. Bristly-glandular: flowers small. Gaultheria.
Not bristly: flowers large. Gardenia.

Leaves opposite.

24. Leaves small and very narrow. Calluna.
Leaves relatively large or broad. 25.
25. Leaves entire. 26.
Leaves toothed, firm. 29.
26. Leaves thin, somewhat dotted beneath. Ligustrum.
Leaves firm. 27.
27. Leaves small, green: twigs 4-ridged. Buxus.
Leaves larger, or else white beneath. 28.
28. Leaves revolute. Kalmia.
Leaves inrolled at base. Gardenia.
29. Leaves not pungent. 30.
Leaves pungently toothed, as in holly. Osmanthus.

30. Leaves dentate. Aucuba.
Leaves crenate. Evonymus.
Leaves serrate. Viburnum.

Leaves whorled.

31. Leaves very small, dagger like. Juniperus.
Leaves large, not dagger-like. 32.
32. Leaves revolute. Kalmia.
Leaves inrolled at base. Gardenia.
33. At least with some prickles or spines. 34.
Unarmed, though sometimes harshly bristly. 61.

Deciduous Shrubs—Armed.

34. Leaves alternate or in alternate clusters. 35.
Leaves opposite, or separated in 4 ranks. 58.

Leaves alternate.

35. With prickles only. 36.
With pungent stipules (at the side of the leaf-base), sometimes also with prickles. 41.
With pungent leaves (standing below the buds or leafy spurs). 46.
With pungent twigs or spurs (above the leaf). 48.
36. Leaves simple, lobed. Ribes.
Leaves compound. 37.
37. Leaves digitate or appearing so. 38.
Leaves pinnate. 39.
38. Leaflets sessile, glabrous. Acanthopanax.
Leaflets stalked, usually hairy and sharp-toothed. Rubus.
39 Leaves once-pinnate. 40.
Leaves bipinnate. Aralia.
40. Leaves disarticulating from the stem. Rosa.
Petioles breaking above the base. Rubus.
41 Leaves simple. 42.
Leaves compound. 43.
42. Fruit dry, winged. Paliurus.
Fruit fleshy. Zizyphus.
43. Leaves with translucent dots, aromatic. Zanthoxylum.
Leaves not aromatic. 44.

44. Leaves with terminal leaflet. Robinia.
Leaves without terminal leaflet. 45.
45. Leaflets blunt or notched. Caragana.
Leaflets acute. Halimodendron.
46. Leaves appearing simple, often clustered on short spurs above a 1- or 3-pronged spine. Berberis.
Leaves distinctly compound, with pungent axis. 47.
47. Leaflets acute or bristle-tipped. Halimodendron.
Leaflets blunt or notched. Caragana.
48. Scurfy with silvery or brown scales. 49.
Not scurfy. 50.
49. Leaves narrow, nearly linear. Hippophäe.
Leaves lanceolate or elliptical. Elaeagnus.
50. Sap milky. 51.
Sap not milky. 52.
51. Leaves narrow (under 25 mm.): fruit small. Bumelia.
Leaves broader: fruit like a gigantic mulberry. Maclura.
52. With nectar-glands on petiole or leaf-base. Prunus.
Without nectar-glands. 53.
53. Twigs distinctly angled. 54.
Twigs rounded: fruit a pome. 56.
54. Leaves as well as twigs pungent. Ulex.
Leaves not pungent. 55.
55. Leaves minute (under 1 cm.): twigs green. Cytisus.
Leaves larger: twigs whitish. Lycium.
56. Core of fruit papery: fruit large: bud-scales thin. 57.
Core bony: fruit small: buds with fleshy scales. Crataegus.
57. Glabrous. Chaenomeles.
More or less woolly. Pyrus.

Leaves opposite.

58. Scurfy with silvery or brown scales. Shepherdia.
Not scurfy. 59.
59. Spines short, between the uppermost buds. Rhamnus.
Spines spur-like. 60.
60. Leaves rounded at base. Viburnum.
Leaves acute at both ends. Forestiera.

Deciduous Shrubs—Unarmed.

61. Leaves alternate or in alternate clusters. 62.
Leaves opposite or, if separated, in 4 ranks. 174.
Leaves whorled. 234.

Leaves alternate.

62. Leaves simple or appearing so. 63.
Leaves distinctly compound. 149.

Simple.

63. Leaves extremely small or very narrow. 64.
Leaves relatively large or broad. 65.
64. Leaves almost scale-like, overlapping. Tamarix.
Leaves elongated, separated. Spiraea.
65. Stipule-scars encircling the twig: buds large. Magnolia.
Stipule-scars not encircling the twig. 66.
66. Leaves entire or minutely ciliate or serrulate. 67.
Leaves distinctly crenate or toothed. 97.
Leaves lobed. 139.

Entire.

67. Buds naked, or very brown-hairy, 2 ranked. Asimina.
Buds with scales, not very hairy. 68.
68. Aromatic. 69.
Not markedly aromatic. 71.
69. With abundant gummy sap when the twigs are cut. Cotinus.
Not gummy. 70.
70. Leaves mucilaginous, mostly lobed: twigs green. Sassafras.
Leaves not mucilaginous, never lobed. Benzoin.
71. Lower leaves often opposite. Lagerstroemia.
Leaves all alternate, or clustered above. 72.
72. Leaves palmately nerved, 2-ranked, rather large. 73.
Leaves pinnately veined. 74.
73. Leaves nearly round: buds small. Cercis.
Leaves elliptical: buds long. Corylopsis.
74. Buds with a single scale: no end-bud. Salix.
Bud-scales several. 75.
75. Twigs constricted at winter-nodes: bark tough. Dirca.
Twigs not constricted, or bark not very tough. 76.

76. Leaves with twinned hairs beneath. Cornus.
Leaves resinous beneath. Gaylussacia.
Leaves neither resinous nor with twinned hairs. 77.
77. Leaves with silvery or brown scales. Elaeagnus.
Leaves hairy or ciliate or stellate-scurfy. 78.
Leaves essentially glabrous when mature. 84.
78. Leaves woolly or scurfy beneath. 79.
Leaves not woolly. 81.
79. Leaves rather large, or else fruit dry. 80.
Leaves moderate: berry-like fruit small. Vaccinium.
Leaves and berry-like fruit both small. Cotoneaster.
80. Leaves round-elliptical, woolly beneath. Cydonia.
Leaves and twigs for a time stellate-scurfy. Styrax.
81. Twigs coarse, hairy: bundle-traces 3. Leitneria.
Twigs rather slender: bundle-trace 1. 82.
82. Buds pressed into grooves in the stem. Lyonia.
Buds not in grooves. 83.
83. Leaves very raised-veiny. Vaccinium.
Leaves not raised-veiny. Rhododendron (Azalea; Rhodora).
84. Leaves lanceolate. 85.
Leaves obovate or elliptical or oblong. 91.
85. Twigs green, distinctly angled. Genista.
Twigs not green. 86.
86. Leaves crowded at tip. Daphne.
Leaves scattered. 87.
87. With stellate hairs when young. Styrax.
Without star-shaped hairs. 88.
88. Fruit dry: bark shredding. Pieris.
Fruit fleshy. 89.
89. Leaf-scars concave at top. Pyrularia.
Leaf-scars not concave. 90.
90. Fruit short-stalked, red. Ilex.
Fruit long-stalked, blue. Vaccinium.
91. Leaves green on both sides. 92.
Leaves pale or whitened beneath. 96.

92. Leaves crowded at ends of the twigs. Enkianthus.
Leaves scattered. 93.
93. Leaves very veiny. Vaccinium.
Leaves not very veiny. 95.
94. Leaves acute at both ends. Styrax.
Leaves rounded at both ends. Andrachne.
95. Bundle-trace one. 96.
Bundle-traces 3: fruit hard, star-shaped. Exochorda.
96. Twigs fluted: fruit dry. Securinega.
Twigs not fluted: fruit berry-like. Nemopanthus.

Toothed.

97. With minute but conspicuous resin-glands. Myrica.
Leaves at most microscopically glandular. 98.
98. Leaves palmately nerved or triple-nerved. 99.
Leaves pinnately veined. 102.
99. Pith chambered: fully lignified. Celtis.
Pith continuous: often dying back in winter. 100.
100. Leaves small (scarcely 5 cm. long). Spiraea.
Leaves distinctly larger. 101.
101. Leaves elliptical-ovate, finely toothed. Ceanothus.
Leaves rounded, coarsely toothed. Vitis.
102. Buds evidently stalked, or developing the first year or producing clusters of flowers. 112.
Buds not stalked. 107.
103. Leaves 2-ranked. 104.
Leaves more than 2-ranked. 105.
104. Leaves entire below, crenate above. Fothergilla.
Leaves crenate throughout. Hamamelis.
Leaves sharply serrate. Stachyurus.
105. Bundle-trace 1: usually branching the first year. 106.
Bundle-traces 3: buds distinctly stalked. Alnus.
106. Flowers on glabrate leafy shoots. Styrax.
Flowers in woolly racemes. Clethra.
107. Pith rather large, star-shaped. 108.
Pith small if grooved. 109.

108. Buds crowded above, with several scales. Quercus.
Buds not crowded above, with 2 exposed scales. Castanea.
109. Leaves, at least on some shoots, 2-ranked. 110.
Leaves in more than 2 ranks. 115.
110. Twigs often bristly: fruit a nut in a husk. Corylus.
Twigs not bristly. 111.
111. Pith 3-sided, small: flowers in catkins. Betula.
Pith not 3-sided. 112.
112. Buds short.
Fruit fleshy: twigs not green. Photinia.
Fruit dry. 113.
Buds elongated (5 mm.): fruit berry-like. Amelanchier.
113. Twigs bright green: leaves sharply toothed. Kerria.
Twigs duller. 114.
114. Leaves entire below, crenate above. Fothergilla.
Leaves crenate throughout. Hamamelis.
115. Twigs rather coarse: not stellate-pubescent. Corylus.
Twigs slender. 116.
116. Stellate-roughened: buds superposed. Styrax.
Without stellate hairs: buds solitary. 117.
117. With nectar-glands on petiole or leaf-base. Prunus.
Without nectar-glands. 118.
118. Pith chambered. 119.
Pith continuous. 120.
119. Leaves thin and flat. Halesia.
Leaves firm, revolute. Symplocos.
120. Leaves appearing entire except under the lens. 121.
Leaves distinctly, if finely, crenate or toothed. 123.
121. Buds pressed in grooves in the stem. Lyonia.
Buds not in grooves. 122.
122. Branches long and slender. Spiraea.
Branches not wand-like. Leucothöe.
123. Leaves with dark glands on the midrib above. Aronia.
Leaves without such glands. 124.
124. Bud-scale solitary: flowers in catkins. Salix.
Bud-scales several. 125.

125. Leaves rather woolly beneath. 126.
Leaves not woolly. 131.
126. Twigs with star-shaped hairs. Clethra.
Twigs not stellate-hairy. 127.
127. Twigs rather woolly: buds often superposed. Ilex.
Twigs not woolly: buds not superposed. 128.
128. Leaves rather large: bundle traces 3. Pyrus.
Leaves smaller. 129.
129. Bundle-traces 3. Photinia.
Bundle-trace 1. 130.
130. Fruit fleshy. Ilex.
Fruit of several akenes in each calyx. Spiraea.
131. Buds and petioles with long straight hairs. Stewartia.
Not long-hairy. 132.
132. Leaves rather fleshy: bundle-traces 5. Baccharis.
Leaves not succulent: bundle-traces fewer. 133.
133. Leaves green on both sides. 134.
Leaves pale or white beneath: fruit dry. 137.
134. Fruit fleshy. 136.
Fruit of several akenes in each calyx. Spiraea.
Fruit of small dehiscing capsules. 135.
135. Leaves crowded at end: fruit stalks long. Enkianthus.
Leaves scattered: fruit nearly sessile. Itea.
136. Fruit crowned with the sepals. Photinia.
Fruit not bearing the sepals. Ilex.
137. Fruit hard, star-shaped: bundle-traces 3. Exorchorda.
Fruit of small follicles: bundle-trace 1. 138.
138. Stamens short: follicles glabrous. Spiraea.
Stamens showy: follicles silky. Neviusia.

Lobed.

139. Foliage aromatic. 140.
Not strikingly aromatic. 141.
140. Leaves long and narrow, glandular-dotted. Myrica.
Leaves broad, mucilaginous. Sassafras.
141. With nectar-glands on petiole or leaf-base. Prunus.
Without such nectar-glands. 142.

142. Twigs bristly. **Rubus.**
Twigs not bristly. 143.
143. Leaves palmately nerved. 144.
Leaves pinnately veined. 147.
144. Leaves acute. 145.
Leaves often obtuse: fruit berry-like. Ribes.
145. Twigs at first velvety: flowers large. Hibiscus.
Twigs glabrous: flowers small. 146.
146. Bark splitting early: fruit fleshy. Ribes.
Bark splitting late: fruit dry. Physocarpus.
147. Twigs rather stout: leaves large and woolly. Pyrus.
Twigs slender: leaves rather small. 148.
148. Leaves 2-ranked: buds superposed. Stephanandra.
Leaves more than 2-ranked: buds not superposed. Spiraea.

Compound.

☞ Learn the characters of *poison ivy* (152) and *poison sumach* (159).

149. Leaves once compound. 150.
Leaves often or always bipinnate. 169.
150. Leaves digitate or appearing so. 151.
Leaves distinctly pinnate. 156.
151. CAUTION.—Sap milky or resinous, abundant: leaflets 3, often coarsely toothed or lobed. 152.
Sap not milky. 153.
152. POISONOUS.—Often climbing or with aerial roots: glabrate: fruit white. Rhus (Toxicodendron).
Low-bushy, very aromatic: fruit red. Rhus.
153. Leaves with pellucid dots. Ptelea.
Leaves not pellucid-dotted. 154.
154. Leaflets entire. 155.
Leaflets toothed, acute. Rubus.
155. Leaflets 3. Laburnum.
Leaflets more than 3. Caragana.
156. CAUTION.—Leaflets entire. 157.
Leaflets often toothed. 163.
157. Leaflets pellucid glandular, small. Amorpha.
Leaflets without translucent dots. 158.

158. Bristly or with sticky glands. Robinia.
Neither bristly nor sticky. 159.
159. VERY POISONOUS.—Sap milky. Rhus (Toxicodendron).
Sap not milky. 160.
160. Leaves with terminal leaflet. 161.
Leaves without terminal leaflet. Caragana.
161. Leaflets short and broad. 162.
Leaflets narrow, silky: plant low. Potentilla.
162. Leaflets very small (under 1 cm.), sessile. Calophaca.
Leaflets larger (1.5 cm.), distinctly stalked. Colutea.
163. Leaves with nectar-glands on the teeth. Ailanthus.
Without nectar-glands. 164.
164. Leaf-scar nearly encircling the bud. Rhus.
Leaf-scar not encircling the bud. 165.
165. Rachis or axis of the leaf broadly winged. Rhus.
Rachis not winged between the leaflets. 166.
166. Leaf-scars narrow, half encircling the twig. 167.
Leaf-scars broad. 168.
167. More or less tree-like: buds large. Sorbus.
Bushy: buds small. Rosa.
168. Leaf-scars elevated: large shrub. Xanthoceras.
Leaf-scars scarcely raised: low shrub. Sorbaria.
169. Aromatic, with glandular hairs: small. Chamaebatiaria.
Not aromatic, or else large. 170.
170. Leaf-scar nearly encircling the bud. Rhus.
Leaf-scar not encircling the bud. 171.
171. Stem very stout: buds large. Paeonia.
Stem and buds moderate. 172.
172. Leaf-scars nearly encircling the twig. Zanthorhiza.
Leaf-scars not encircling the twig. 173.
173. Very slender, often with tendrils. Ampelopsis.
Stouter: leaflets small. Gleditsia.
Coarse: leaflets moderately large. Rhus.

Leaves opposite.

174. Leaves simple. 175.
Leaves compound. 226.

Simple.

175. Leaves entire. 176.
Leaves, or most of them, toothed. 195.
Leaves lobed. 218.

Entire.

176. Leaves with translucent oil-glands. Hypericum.
Leaves not pellucid-dotted. 177.
177. Very aromatic when crushed. Calycanthus.
Not noticeably aromatic. 178.
178. Leaves very large, cordate: pith excavated. Paulownia.
Leaves moderately small or else pith continuous. 179.
179. Pith chambered or excavated: twigs slender. 180.
Pith continuous. 181.
180. Buds solitary or collateral. Symphoricarpos.
Buds often superposed. Lonicera.
181. Leaves long, narrow and willow-like. Chilopsis.
Leaves not willow-like. 182.
182. Half-woody: often dying back in winter. 183.
Fully lignified. 184.
183. Leaves glossy, Fontanesia.
Leaves dull. Clerodendron.
184. Leaves white beneath, with appressed twin hairs. Cornus.
Leaves without twinned hairs. 185.
185. Leaves rather small (scarcely 25 mm. wide). 186.
Leaves distinctly larger. 191.
186 Leaves microscopically dotted beneath. Ligustrum.
Leaves not dotted. 187.
187. Leaves obtuse, nearly as broad as long. Symphoricarpos.
Leaves acute, more elongated. 188.
188. Some stellate hairs on twigs or leaves. Deutzia.
Without star-shaped hairs. 189.
189. Leaves separated, in 4 ranks. Rhamnus.
Leaves in opposite pairs. 190.
190. Leaves small (scarcely 2 cm. long), rough. Fendlera.
Leaves distinctly larger. Cornus.
191. Leaves whitened beneath, rough-ciliate. Syringa.
Leaves at most paler green beneath. 192.

192. Buds sunken: flowers in a round head. Cephalanthus.
Buds evident: flowers not in heads. 193.
193. Bud-scales hard-pointed: fruit a drupe. Chionanthus.
Bud-scales not hard pointed, or else fruit dry. 194.
194. Leaves microscopically dotted beneath: fruit dry. Syringa.
Leaves sometimes scurfy: fruit fleshy. Viburnum.

Toothed.

195. Buds naked. 196.
Buds with a single scale, in front. Salix.
Buds with several scales, or else concealed. 197.
196. Buds solitary: twigs firm. Viburnum.
Buds superposed: twigs slender or soft. Callicarpa.
197. Twigs with 2 conspicuous hairy lines. Diervilla.
Twigs without hairy lines. 198.
198. Leaves narrow and willow-like, often whorled. Chilopsis.
Leaves not willow-like. 199.
199. Pith hollowed, or with firmer diaphragms. 200.
Pith homogeneous, rarely spongy. 206.
200. Buds solitary over each leaf. 201.
Buds finally clustered: hairs not stellate. Forsythia.
201. Glabrous. 202.
More or less hairy. 203.
202. Fully lignified: twigs with 4 lines or angles. Forsythia.
Half-wooded and tender. Leycesteria.
203. Hairs star- or shield-shaped. 204.
Hairs not star-shaped. 205.
204. Buds naked. Viburnum.
Buds scaly. Deutzia.
205. Most leaves entire. Symphoricarpos.
Leaves regularly but shallowy toothed. Abelia
206. Buds concealed after leaf-fall. Philadelphus.
Buds exposed. 207.
207. Partly woody, or regularly dying back in winter. 208.
Fully lignified. 212.
208. Leaves glossy. Fontanesia.
Leaves rather dull. 209.

209. Twigs very slender. Caryopteris.
Twigs stouter. 210.
210. Twigs 4-sided or winged. Buddleia.
Twigs 2-lined. Diervilla.
211. Leaf-scars raised: bundle-traces 9. Clerodendron.
Leaf-scars not raised: bundle-traces 3 or 5. Hydrangea.
212. With a few or coarse branches. Hydrangea.
Bushy or with slender branches. 213.
213. Leaf-scars ciliate: buds often several. Rhodotypos.
Leaf-scars not ciliate, or else buds solitary. 214.
214. Bundle-traces 3 or more. 215.
Bundle trace one. 217.
215. Leaves with some simple appressed hairs. Hydrangea.
Leaves and twigs with some small stellate hairs. Deutzia.
Without such hairs. 216.
216. Leaves woolly beneath: bark quickly peeling. Jamesia.
Leaves not woolly. Viburnum.
217. Buds solitary: pith often spongy. Evonymus.
Buds superposed. Forestiera.

Lobed.

218. With nectar-glands on the petiole. Viburnum.
Without nectar-glands. 219.
219. Leaves very large, cordate: typically a tree. Paulownia.
Leaves not very large. 220.
220. Pith chambered or excavated. 221.
Pith continuous. 222.
221. Buds clustered: pith chambered. Forsythia.
Buds solitary: pith excavated. Symphoricarpos.
222. Bundle traces 3. 223.
Bundle traces 5-7: twigs rather stout. Hydrangea.
223. Leaves pinnately lobed: twigs slender. Syringa.
Leaves palmately lobed. 224.
224. Buds stalked, or with 2 evident scales. Acer.
Buds sessile, with 4 or more scales. 225.
225. Bud-scales 6 or 8. Acer.
Bud-scales 4. Viburnum.

Compound.

226. Leaves digitate. 227.
Leaves pinnate. 230.
227. Aromatic: leaflets 5-7. Vitex.
Not aromatic. 228.
228. Leaflets three. 229.
Leaflets more than 3. Aesculus.
229. Twigs slender: tender. Jasminum.
Twigs stouter: hardy. Forsythia.
230. Leaflets finely toothed. 231.
Leaflets very coarsely toothed, or else lobed. 232.
231. Pith large: fruit of small berries. Sambucus.
Pith not very large: fruit bladdery. Staphylea.
232. Twigs very glaucous. Acer.
Twigs not glaucous. 233.
233. Pith large: fruit of small berries. Sambucus.
Pith not very large: fruit a large pod. Campsis.

Leaves whorled.

234. Twigs with distinct hairy lines. Diervilla.
Twigs without hairy lines. 235.
235. Rough with star-shaped hairs. Deutzia.
Without stellate hairs. 236.
236. Leaves narrow and willow-like. Chilopsis.
Leaves not willow-like. 237.
237. Buds concealed after leaf-fall. Philadelphus.
Buds not covered by a membrane. 238.
238. Leaves glabrous except for the rough veins: buds sunken: flowers in a small head. Cephalanthus.
Leaves rough or hairy: buds evident. 239.
239. White beneath, with appressed twinned hairs. Cornus.
Without twin-hairs. 240.
240. Leaves rough-hairy: bundle-traces 3 or 5. Hydrangea.
Leaves soft-pubescent: bundle traces 9. Clerodendron.

C. UNDERSHRUBS, BOG PLANTS OR ROCKERY PLANTS

1. Forming cushions or mats: essentially evergreen. 2.
   Not growing in dense mats. 15.

Matted Plants.

2. Leaves simple. 3.
   Leaves digitately compound, of 3 leaflets. 14.
3. Leaves brown-scurfy, elliptical. Rhododendron.
   Leaves not scurfy. 4.
4. Leaves white-hairy beneath, crenate. Dryas.
   Leaves not woolly, entire. 5.
5. Leaves crowded close to the ground. 6.
   Leaves on more or less elongated stems. 7.
6. Leaves fleshy. Sedum.
   Leaves not fleshy. Silene.
7. Leaves widened upwards. Diapensia.
   Leaves not widened upwards. 8.
8. Leaves revolute. Empetrum.
   Leaves not revolute. 9.
9. Leaves veinless, crowded. 10.
   Leaves veined. 12.
10. Leaves needle-shaped: moss-like. Cassiope.
    Leaves lanceolate or oblong: more open. 11.
11. Leaves oblong. Phyllodoce.
    Leaves lanceolate. Phlox.
12. Leaves elliptical or obovate, dotted beneath. Vaccinium.
    Leaves rather lanceolate, not dotted. 13.
13. Stems nearly herbaceous: leaves bristle-tipped. Phlox.
    Stems woody: leaves not bristle-tipped. Pyxidanthera.
14. Stipules small. Potentilla.
    Stipules elongated along the leaf-stalk. Sibbaldia.
15. Loosely low-bushy: leaves simple. 16.
    Neither matted nor bushy. 38.

Bushy Plants.

16. Evergreen. 17.
    Deciduous. 34.

Evergreen Undershrubs.

17. Leaves distinctly alternate. 18.
    Leaves partly or wholly opposite, or overlapping. 26.
    Leaves, or many of them, evidently whorled. 33.
18. Leaves scurfy beneath. Chamaedaphne.
    Leaves not scurfy. 19.
19. Leaves very narrow or small (scarcely 10 mm. long). 20.
    Leaves larger. 21.
20. Leaves not grooved: fruit dry. Phyllodoce.
    Leaves grooved above and beneath. Empetrum.
    Leaves narrowly grooved beneath. Corema.
21. Leaves strongly or closely revolute. 22.
    Leaves slightly or openly revolute. 23.
22. Leaves brown-woolly beneath. Ledum.
    Leaves not woolly, but sometimes whitened. Andromeda.
23. Leaves essentially entire. 24.
    Leaves distinctly serrulate. 25.
24. Leaves not widened upwards. Kalmia.
    Leaves widened upwards. Arctostaphylos.
25. Leaves dotted beneath. Vaccinium.
    Leaves not dotted. Gaylussacia.
26. Moss-like. Cassiope.
    Not moss-like. 27.
27. Leaves very small, overlapping. 28.
    Leaves larger, not overlapping. 29.
28. Gray-pubescent. Hudsonia.
    Not canescent. Calluna.
29. Leaves essentially entire. 30.
    Leaves distinctly toothed, flat. Pachistima.
30. Leaves revolute, small. 31.
    Leaves not revolute, over 50 mm. long. Gardenia.
31. Leaves black-dotted beneath, often alternate. Leiophyllum.
    Leaves not dotted. Loiseleuria.

32. Leaves rather broad. Kalmia.
Leaves narrow and small. 33.
33. Leaf-whorls densely crowded. Erica.
Leaf-whorls separated, some leaves alternate. Corema.

Deciduous Undershrubs.

34. Leaves opposite, with pellucid dots. Ascyrum.
Leaves alternate. 35.
35. Leaves conspicuously resinous-glandular. Gaylussacia.
Leaves scurfy. Chamaedaphne.
Leaves neither resin-dotted nor scurfy. 36.
36. Leaves very sparingly scurfy beneath. Menziesia.
Leaves not at all scurfy. 37.
37. Leaves curly-hairy and resinous. Rhododendron (Rhodora).
Not resinous or woolly, when mature. Vaccinium.
38. With trailing leafy stems. 39.
Forming single few-leaved stems or tufts. 57.

Trailing Plants.

39. Evergreen. 40.
Deciduous. 54.
40. Prickly: leaves compound. 41.
Unarmed: leaves simple. 42.

Evergreen Trailers—Armed.

41. Leaves digitate: petiole breaking above base. Rubus.
Leaves pinnate: leaf-scar on the stem. Rosa.

Evergreen Trailers—Unarmed.

42. Leaves alternate. 43.
Leaves opposite or whorled, not minute. 49.
Leaves 4- or 6-ranked, minute. 53.
43. Aromatic, wintergreen-flavored. Gaultheria.
Acrid: leaves fleshy, scale-like. Sedum.
Not aromatic or very acrid. 44.
44. Leaves characteristically lobed. Hedera.
Leaves not lobed. 45.
45. Leaves revolute. 46.
Leaves not revolute. 47.
46. Leaves short-elliptical, rough. Chiogenes.
Leaves elongated and narrow. Daphne.

47. Leaves white beneath. Vaccinium.
Leaves green beneath. 48.
48. Leaves numerous, small. Cotoneaster.
Leaves larger, cordate. Epigaea.
49. Leaves entire. 50.
Leaves crenate. 52.
50. Leaves small (scarcely 20 mm. long).
Round-ovate. Mitchella.
Oblanceolate. Pyxidanthera.
Leaves larger, lanceolate or elongated-ovate. 51.
51. Glabrous: leaves dark green. Vinca.
Pubescent: leaves often pale-veiny. Lonicera.
52. Leaves round-oval, small. Linnaea.
Leaves elliptical to obovate. Evonymus.
53. Very slender and delicate. Selaginella.
Stouter: leaves relatively narrow. Lycopodium.

Deciduous Trailers.

54. Armed: leaves compound. Rubus.
CAUTION. Unarmed. 55.
55. Leaves opposite. 56.
POISONOUS. Leaves compound. Rhus (Toxicodendron).
56. Leaves entire. Lonicera.
Leaves toothed. Evonymus.

Simple Shoots or Leafy Tufts.

57. Aromatic. 58.
Not aromatic. 59.
58. Leaves lanceolate, bitter. Chimaphila.
Leaves elliptical, wintergreen-flavored. Gaultheria.
59. Leaves veinless, very narrow. Lycopodium.
Leaves veiny, broader. 60.
60. Leaves cordate, bronzing in winter. Galax.
Leaves not heart-shaped, or if so, not bronzing. 61.
61. Leaves serrate. Moneses.
Leaves often coarsely dentate, large. Pachysandra.
Leaves crenate or entire. 62.
62. Leaves partly or wholly from the ground. Pyrola.
Leaves at end of a short stem. Cornus.

D. SCRAMBLING OR CLIMBING WOODY PLANTS.

1. Evergreen. 2.
   Deciduous. 7.
2. With prickles. 3.
   Unarmed. 4.

Evergreen Climbers—Armed.

3. Scrambling: leaves pinnate. Rosa.
   With tendrils on the petiole: leaves simple. Smilax.

Evergreen Climbers—Unarmed.

4. Leaves alternate, typically lobed: climbing by roots. Hedera.
   Leaves opposite or whorled, not lobed. 5.
5. Climbing by roots: leaves small. Evonymus.
   Climbing by leaf-tendrils. Bignonia.
   Twining. 6.
6. Leaves sessile, the upper united in pairs. Lonicera.
   Leaves stalked, sometimes whorled. Gelsemium.
7. With spines or prickles; scrambling. 8.
   Unarmed. 10.

Deciduous Climbers—Armed.

8. With detachable prickles: leaves compound. 9.
   With pungent branch spurs: leaves simple. Lycium.
9. Leaves digitate, breaking away above base. Rubus.
   Leaves clearly pinnate, leaving low leaf-scars. Rosa.

Deciduous Climbers—Unarmed.

10. Leaves alternate. 11.
    Leaves opposite. 28.

Leaves alternate.

11. Leaves simple. 12.
    CAUTION.—Leaves compound. 23.
12. Twining: without tendrils. 13.
    With tendrils: leaves palmately nerved. 20.

Simple.

13. Leaves neither toothed, angled, nor lobed. 14.
    Leaves crenate or finely toothed. 15.
    Leaves rounded or angular or short-lobed. Menispermum.
    Leaves, or many of them, deeply or hastately lobed. 18.
14. Leaves very large, cordate. Aristolochia.
    Leaves moderate: stem slender. Cocculus.
15. Pith excavated or chambered. Actinidia.
    Pith continuous. 16.
16. Fruit opening: seeds with red aril. Celastrus.
    Fruit indehiscent. 17.
17. Leaves large (8-12 cm. long). Actinidia.
    Leaves smaller (scarcely 6 cm.). Berchemia.
18. Lower lobes nearly separated. Solanum.
    Lower lobes not severed from the rest. 19.
19. Leaves thin, with deep sinuses. Calycocarpum.
    Leaves firm, hastate or unlobed. Cocculus.
20. Tendrils few, without suckers: fruit cluster forked. 21.
    Tendrils abundant. 22.
21. Leaves thin, broadly ovate. Ampelopsis.
    Leaves rather fleshy. Cissus.
22. Fruit in open forked clusters. Parthenocissus.
    Fruit in pyramidal clusters. Vitis.

Compound.

23. POISONOUS. With aerial roots but no tendrils, or scrambling. Rhus (Toxicodendron).
    With tendrils, and sometimes also aerial roots. 24.
    Twining. 26.
24. Leaves once compound. 25.
    Leaves bipinnate. Ampelopsis.
25. Leaves thin. Parthenocissus.
    Leaves fleshy. Cissus.
26. Leaflets 3 or 5, digitate or nearly so. 27.
    Leaflets more than 5, clearly pinnate. Wisteria.
27. Leaflets 5, elongated. Akebia.
    Leaflets 3, large and broad. Pueraria.

Leaves opposite.

28. Leaves simple. 28.
Leaves compound. 32.

Simple.

29. Scrambling: pith chambered. Forsythia.
Climbing by the leaf-stalks. Clematis.
Climbing by aerial roots. 30.
Twining. 31.
30. Leaves nearly entire. Decumaria.
Leaves distinctly serrate. Hydrangea.
Leaves distinctly dentate. Schizophragma.
31. Sap not milky: pith excavated. Lonicera.
Sap milky: pith continuous. Periploca.

Compound.

32. Twining or scrambling. 33.
With tendrils or climbing roots. 34.
33. Twigs 4-lined: scrambling. Forsythia.
Twigs rounded: twining. Jasminum.
34. Climbing by aerial roots. Campsis.
Climbing by tendrils. 35.
35. Tendrils ending the leaves. Bignonia.
The leafstalks prehensile and coiling. Clematis.

SYSTEMATIC ARRANGEMENT OF THE PLANT MATERIALS WITH KEYS TO SPECIES UNDER EACH GENUS.

Division PTERIDOPHYTA. Fernworts.

Family LYCOPODIACEAE. Clubmoss Family.

A small family of small herbaceous plants of little use. Wild species are gathered for Christmas decorations; a few are grown in plant houses; and the following are sometimes used for ground-covers in shady places.

LYCOPODIUM. Club Moss. Ground Pine.

Low often creeping evergreen flowerless herbs with overlapping 1-nerved small leaves, and microscopic spores of one sort in axillary small or spiked sporangia.

1. Leaves 4-ranked on fan-like branches. L. complanatum.
   Leaves alternate, not on fan-like branches. 2.
2. Spore-cases not in spikes. L. lucidulum.
   Spore-cases in terminal spikes. 3.
3. Spikes nearly sessile: plants tree-shaped. L. obscurum.
   Spikes long-stalked, usually paired. L. clavatum.

Family SELAGINELLACEAE.

A small family, mainly of the tropics, of similar use to the Lycopodiaceae.

SELAGINELLA.

Small evergreen flowerless herbs with small 4- or 6-ranked 1-nerved leaves and small spores of two kinds (megalospores visible to the naked eye, and much smaller microspores) in small axillary or spiked sporangia.

Upper and lower leaves smaller than the lateral. S. apus.

Division SPERMATOPHYTA. Flowering Plants.

Subdivision GYMNOSPERMAE. Naked-Seed Plants.

Family GINKGOACEAE. Ginkgo Family.

A very ancient tree family, consisting of only the following genus of a single species, scarcely known except as cultivated.

GINKGO. Maidenhair Tree.

Rather large conical or irregularly branched deciduous tree with pale soft ductless wood without resin-passages, with very fine medullary rays; moderately stout often zig-zag rounded twigs; small angular spongy or fissured pith; alternate low small half-round leaf-scars with 2 bundle-traces; no stipule-scars; round-ovoid rather small solitary sessile buds often developing the first year; rather large fan-shaped simple long-stalked leaves, many-veined from the base, mostly clustered on short spurs; dioecious inconspicuous naked flowers, the staminate in catkins; and rather large yellowish ill-scented drupe-like fruits.

1. Leaves green. 2.
   Leaves variegated. — G. biloba variegata.
2. Weeping. — G. biloba pendula.
   Not weeping. 3.
3. Leaves short-lobed. — G. biloba.
   Leaves deeply cut. — G. biloba laciniata.

Family TAXACEAE. Yew Family.

A small family of trees and shrubs, of no great use except as cultivated for evergreen specimens or masses: the wood of classic use in archery.

TAXUS. Yew.

Evergreen shrubs or trees with rather hard reddish ductless wood without resin-passages, with spirally marked tracheides; terete rather slender twigs; alternate minute low crescent-shaped leaf-scars with a single bundle-trace; no stipule-scars; narrowly lanceolate often falcate small entire pointed leaves; rounded buds with numerous scales; monoecious cone-like naked flowers; and solitary bony seeds each in a fleshy cup-like red or orange aril.

1. Leaves abruptly contracted to the sharp tip. 2.
   Leaves rather gradually acute. 3.
2. Tree or tall shrub. T. cuspidata.
   Low compact shrub. T. cuspidata nana.
3. Leaves normally dark green. 4.
   Leaves rather yellowish green: very low shrub. T. canadensis.
4. Trees. 5.
   Low and trailing. T. baccata procumbens.
5. Round-topped. 6.
   Pyramidal. 8.
6. Leaves green. 7.
   Leaves yellow. T. baccata aurea.
   Leaves whitish-striped. T. baccata argentea.
7. Fruit red. T. baccata.
   Fruit yellow. T. baccata fuctu-luteo.
8. Leaves green. T. baccata fastigiata.
   Leaves yellow. T. baccata fastigiata variegata.

TORREYA. California Nutmeg.

Evergreen trees with yellowish ductless soft wood without resin-passages; rather slender twigs; alternate somewhat raised transversely elliptical small leaf-scars with a single bundle trace; no stipule-scars; ovoid buds with several keeled scales; linear mucronate flat leaves, white-lined beneath; monoecious catkin- or cone-like naked flowers; and rather large drupe-like fruits.

1. Leaves (25-30 mm.) and bud-scales long. T. californica.
   Leaves (scarcely 25 mm.) and bud-scales short. 2.
2. Buds light brown: pale lines of leaves broad. T. taxifolia.
   Buds red-brown: pale lines of leaves narrow. T. nucifera.

Family PINACEAE. Conifer Family.

An ancient family of relatively few chiefly evergreen genera and species, but these widespread and often very numerous in individuals forming conifer forests of large extent and furnishing the principal "soft woods" of temperate regions. Largely employed for windbreaks and evergreen effects; characteristically trees, but likely to occur in shrubby form.

PICEA. Spruce.

Conical evergreen trees with rather soft yellowish-white ductless wood with scattered resin-passages (exceptionally brown and with transversely clustered passages); moderate fluted often hairy twigs; small homogeneous pith; 5-ranked usually 4-sided needle-like leaves on raised bases bearing the angled leaf-scars with a single bundle-trace; no stipule-scars; ovoid scaly more or less resinous buds; monoecious catkin-like or cone-like naked flowers; and pendent cones with persistent thin scales each covering 2 winged seeds.

1. Leaves small (scarcely 15 mm.), green, blunt. P. orientalis.
   Leaves mostly longer (20-25 mm.), acute. 2.
2. Leaves green. 3.
   Leaves pale or whitened. 4.
3. Not weeping. P. excelsa.
   Weeping. P. excelsa pendula.
4. Leaves merely pale. 5.
   Leaves very glaucous. P. pungens.
5. Odor balsamic: cones large (10-18 cm.). P. excelsa.
   Odor fetid: cones small (scarcely 5 cm.). P. canadensis.

TSUGA. Hemlock Spruce.

Evergreen percurrent trees with ductless brownish wood without resin-passages; slender fluted twigs; small continuous pith; alternate somewhat raised minute half-round leaf scars with a single bundle-trace; no stipule-scars; sessile ovoid buds with several exposed scales; very small oblong or lanceolate sometimes serrulate short-petioled flat leaves whitened beneath; monoecious catkin- or cone-like naked flowers; and small ovoid cones, each thin scale covering 2 winged seeds.

1. Trees. 2.
   Prostrate shrub. T. canadensis nana.
2. Not weeping. 3.
   Weeping. T. canadensis pendula.
3. Conical or oblong. 4.
   Round-topped. T. canadensis globosa.

4. Green. T. canadensis.
Whitish on the young growth. T. canadensis albo-spica.

PSEUDOTSUGA. Douglas Fir.

Percurrent evergreen, often of very large size, with rather soft often reddish ductless wood with transversely clustered resin passages; moderate fluted glabrate twigs; small homogeneous pith; 5-ranked round slightly raised leaf scars with a single bundle-trace; no stipule-scars; ovoid scaly dry buds; flat linear entire leaves, white-lined beneath; monoecious catkin-like or cone-like naked flowers; and moderate-sized spreading cones with persistent thin scales, each covering 2 winged seeds.
Cones with long-protruding bract-points. P. mucronata.

ABIES. Fir.

Percurrent spire-like evergreen trees with flaking bark in age, sometimes resinous-blistered; pale soft ductless wood exceptionally with a few resin passages; slender terete twigs, small pale homogeneous pith; elliptical unraised leaf-scars with a single bundle-trace; no stipule scars; ovoid scaly resinous buds largely clustered near the end; small alternate oblong mostly blunt or notched flat entire leaves white and stomatiferous beneath, with 2 resin-passages; monoecious catkin like or cone-like naked flowers; and erect cones with 2 winged seeds under each of the deciduous scales.

1. Leaves flat or grooved, green above, whitened beneath. 2.
Leaves blue or glaucous, often 4-sided. 6.
2. Leaves mostly blunt or notched. 3.
Leaves typically pointed: twigs pubescent. A. Veitchii.
3. Cones green or purple. 4.
Cones orange-brown. 5.
4. Cones 10 cm.: bracts shorter than scales. A. balsamea.
Cones nearly 15 cm. long: bracts longer than scales. A. Picea.
5. Bracts longer than scales. A. Nordmanniana.
Bracts shorter than scales. A. cilicica.
6. Bracts longer than scales, recurved. A. nobilis.
Bracts shorter than scales. A. concolor.

LARIX. Larch. Tamarack.

Percurrent deciduous trees with reddish or brown soft wood with few resin passages; slender deeply fluted twigs; small pale homogeneous pith; small alternate raised crescent-shaped or transverse leaf-scars with 1 bundle-trace; no stipule-scars; solitary sessile round buds with a number of exposed scales; flat entire narrow green leaves clustered on short spurs; monoecious catkin- or cone-like naked flowers; and round-ovoid drooping cones with persistent thin scales each covering 2 winged seeds.

1. Cones 15-40 mm. long: scales usually downy. 2.
   Cones 10-15 mm. long: scales glabrous. L. laricina.
2. Branches rather spreading. L. decidua.
   Branches distinctly drooping. L. decidua pendula.

CEDRUS. Cedar.

Evergreen openly branched trees with yellowish soft ductless wood without resin-passages; fluted rather slender twigs; small continuous pith; alternate raised 4-sided small leaf-scars with a single bundle-trace; no stipule-scars; round or ovoid scaly not resinous buds; 4-angled needle-like leaves often crowded on short spurs; monoecious catkin- or cone-like naked flowers; and cones with thin scales each covering 2 winged seeds.

1. Branches not drooping: cones flat or hollowed at tip. 2.
   Branches drooping: cones rounded at tip. 6.
2. Broad and flat-topped. 3.
   Conical or oblong. 5.
3. Trees. 4.
   Shrubby. C. Libani nana.
4. Leaves green. C. Libani.
   Leaves glaucous. C. Libani glauca.
5. Conical. C. atlantica.
   Narrowly oblong. C. atlantica fastigiata.
6. Of erect growth. 7.
   Very spreading or prostrate. C. Deodara pendula.
7. Narrowly oblong. C. Deodara fastigiata.
   Rather conical. 8.

8. Leaves green. C. Deodara viridis.
   Leaves bluish or glaucous. 9.
   Leaves yellow. C. Deodara aurea.
9. Leaves not whorled. 10.
   Leaves whorled below. C. Deodara verticillata.
10. Leaves merely blue-green. C. Deodara.
    Leaves very glaucous. 11.
11. Glaucous throughout. C. Deodara argentea.
    Becoming white at the tips. C. Deodara alba-spica.

PINUS. Pine.

Conical or openly branched evergreen trees with soft and white or hard and yellow ductless abundantly resinous wood; moderate roundish twigs; small homogeneous pith; 5-ranked spurs crowned by tufts of usually 2, 3 or 5 elongated needle-like "leaves" or phylloid shoots; round spur-scars; narrowly crescent-shaped scale-scars; no stipule-scars; ovoid sessile buds with sometimes resinous scales; monoecious naked catkin-like or cone-like naked flowers; and cones with 2 usually thin-winged seeds above each of the mostly thickened scales.

1. Needles 2 in a cluster. 2.
   Needles prevailingly 3 in a cluster. 15.
   Needles 5 in a cluster. 16.
2. Branches orange or red. 3.
   Branches grayish or black. 9.
3. Needles short (4-8 cm.), bluish: bark orange. 4.
   Needles long (10-15 cm.), green. 14.
4. Shrubs. 5.
   Trees. 6.
5. Conical P. sylvestris columnaris.
   Rounded. P. sylvestris pumila.
6. Conical. P. sylvestris fastigiata.
   Rather weeping. P. sylvestris pendula.
   Neither conical nor weeping. 7.
7. Needles very glaucous. P. sylvestris argentea.
   Needles only slightly glaucous. 8.

8. Needles blue-green. P. sylvestris.
   Needles yellow when young. P. sylvestris aurea.
9. Needles rather short (under 8 cm.). 10.
   Needles rather long (over 9 cm.), dull. 12.
10. Twigs glaucous. P. viginiana.
    Twigs not glaucous. 11.
11. Tree. P. montana.
    Round shrub. P. montana Mughus.
12. Trees. 13.
    Shrub. P. nigra pygmaea.
13 Pyramidal. P. nigra.
    Round-topped. P. nigra austriaca.
14. Bark orange. P. nigra cebennensis.
    Bark rather red: needles glossy. P. resinosa.
15. Needles moderately long (under 15 cm.). P. rigida.
    Needles very long (over 15 cm.). P. Taeda.
16. Twigs glabrate. 17.
    Twigs tomentose. P. Cembra.
17. Trees. 18.
    Dwarfed. 19.
18. With spreading branches. P. Strobus.
    With ascending branches. P. Strobus fastigiata.
19. Needles very glaucous. P. Strobus alba.
    Not very glaucous. 20.
20. Bush-like. P. Strobus brevifolia.
    Umbrella-shaped. P. Strobus umbraculifera.
    Prostrate. P. Strobus prostrata.

SCIADOPITYS. Umbrella Pine.

Evergreen percurrent trees with ductless soft white wood without resin passages; moderate fluted buff twigs swollen at intervals; continuous pith; no stipule scars; alternate persistent ciliate scales whorled at the swollen nodes and each then with a long linear phylloid shoot in its axil; monoecious catkin- or cone-like naked flowers; and cones with several-seeded scales.

"Leaves" green, grooved, revolute. S. verticillata.

SEQUOIA.

Evergreen percurrent trees branching from pits in the thick bark, with ductless soft red wood without resin passages; alternate crowded decurrent scale-like but hard or flat entire small leaves; no stipule-scars; monoecious catkin- or cone-like naked flowers; and moderately small ellipsoid cones with thick-tipped scales, each covering several seeds.

Buds naked: leaves scale-like, green (Big Tree). S. gigantea.
Buds scaly: some leaves flat and spreading, these white lined beneath. (Redwood). S. sempervirens.

CRYPTOMERIA.

Evergreen trees with reddish soft ductless wood without resin-passages; angular twigs; small pointed 4-angled entire decurrent alternate overlapping persistent leaves; no stipule scars; monoecious catkin- or cone-like naked flowers; and small roundish cones with thickened scales, each covering several winged seeds.

1. Trees. 2.
   Shrubs. 3.
2. Leaves soft, mostly straight. C. japonica.
   Leaves stiff, upcurved. C. japonica araucarioides.
3. Leaves not coiled. C. japonica nana.
   Leaves coiled. C. japonica spiralis.

TAXODIUM. Bald Cypress.

Deciduous percurrent conical (or in the swamps broad-topped) trees with rather soft white or brownish ductless wood without resin passages; slender twigs with very minute low crescent shaped leaf-scars with a single bundle-trace, and numerous round scars from which foliar shoots have fallen; very small alternate lanceolate entire leaves mostly on deciduous foliar-shoots and so simulating pinnately compound leaves; no stipule-scars; round-ovoid buds with numerous scales; monoecious catkin-like or cone-like naked flowers; and rather small globose cones with thick scales each covering 2 winged seeds.

1. Leaves very short and scale-like, alternately appressed on the stem. (Glyptostrobus). T. distichum imbricatum.
   Leaves lanceolate, chiefly on flattened deciduous sprays. 2.
2. Trees. 3.
   Dwarf. T. distichum nanum.
3. Branches spreading. T. distichum.
   Branches ascending. T. distichum pyramidatum.
   Branches erect. T. distichum fastigiatum.

THUJA. Arbor Vitae.

Evergreen shrubs or trees with rather soft brownish ductless wood without resin-passages; rather slender twigs; 4-ranked minute scale like leaves on finally deciduous fan-like foliar-shoots; no stipule-scars; monoecious catkin- or cone-like naked flowers; and small cones with 2 winged seeds under each of the rather thin scales.

1. Leaves closely appressed. 2.
   Leaves spreading. (Retinospora forms). 13.
2. Foliar-shoots mostly horizontal. 3.
   Foliar-shoots vertical. 9.
3. Oblong or conical. 4.
   Round-topped. 8.
4. Leaves green. 5.
   Leaves wholly or partly yellow. T. occidentalis lutea.
   Leaves tipped or variegated with white. 7.
5. Tall. T. occidentalis.
   Dwarf. 6.
6. Irregular in shape. T. occidentalis cristata.
   Compactly conical. T. occidentalis conica densa.
7. Leaves tipped with white. T. occidentalis alba.
   Leaves variegated with white. T. occidentalis argentea.
8. Leaves green. T. occidentalis globosa.
   Leaves entirely yellow when young. T. occidentalis aurea.
9. Oblong or conical. 10.
   Round-topped. 12.
10. Leaves green. 11.
    Leaves variegated with yellow. T. orientalis aureo-variegata.

11. Rather oblong. T. orientalis.
Very conical. T. orientalis pyramidalis.
12. Leaves green. T. orientalis Sieboldii.
Leaves yellow. T. orientalis aurea.
13. Leaves rather soft. T. occidentalis ericoides.
Leaves stiff. T. orientalis decussata.

THUJOPSIS.

Evergreen shrubs or conical trees resembling Thuja, but with several instead of 2 seeds under each scale of the cones.

1. Foliage green. 2.
Tip of foliage-sprays white. T. dolabrata variegata.
2. Tall. T. dolabrata.
Dwarf. T. dolabrata nana.

CUPRESSUS. Cypress.

Evergreen trees with rather soft mostly brownish wood without resin passages; opposite appressed scale-like overlapping small persistent decurrent leaves on rather fan-like finally deciduous foliage sprays; no stipule-scars; monoecious catkin- or cone-like naked flowers; and small round rather fleshy-scaled cones with numerous wingless seeds under each scale.

1. Leaves with prominent resin-blisters on the back. 2.
Leaves usually without evident glands, glaucous. C. arizonica.
2. Conical: cones scarcely 25 mm. in diameter. C. Macnabiana.
Narrowly fastigiate: cones often larger. C. sempervirens.

CHAMAECYPARIS. White Cedar. Retinospora.

Evergreen shrubs or trees with ductless pale or brownish soft wood without resin-passages; opposite crowded very small leaves spreading or in maturity closely appressed on rather indefinitely fan-shaped finally deciduous foliage-sprays; no stipule-scars; monoecious catkin- or cone like naked flowers; and small subglobose cones with 2 or 3 wingless seeds under each thick-tipped scale.

1. Leaves closely appressed. 2.
Leaves spreading ("Retinispora"). 5.

2.	Leaves white-lined beneath, somewhat flattened. 3.	
	Leaves without white lines. 4.	
3.	Green.	C. pisifera.
	Yellow.	C. pisifera aurea.
4.	Green.	C. thyoides.
	Glaucous.	C. thyoides glauca.
	Partly yellow.	C. thyoides variegata.
5.	Branchlets long and slender.	C. pisifera filifera.
	Branchlets not elongated. 6.	
6.	Dense and heath-like.	C. thyoides ericoides.
	Not heath-like. 7.	
7.	Leaves short, little spreading. 8.	
	Leaves widely spreading.	C. pisifera squarrosa.
8.	Green.	C. pisifera plumosa.
	White-tipped.	C. pisifera plumosa argentea.
	Yellow, when young.	C. pisifera plumosa aurea.

JUNIPERUS. Juniper. Savin. Red Cedar.

Evergreen shrubs or trees with brown or red ductless wood without resin-passages; slender twigs ultimately falling with their small scale- or dagger-like opposite or whorled leaves,—in some species spreading on young or abnormal growth and closely appressed on characteristic plants; small usually cone- or catkin-like monoecious naked flowers; and small drupe- or berry-like few-seeded fruit.

1.	Leaves in whorls of three. (Juniper).	J. communis.
	Leaves opposite. 2.	
2.	Fruits on straight stalks. 3.	
	Fruits on curved stalks. (Savin).	J. sabina.
3.	Fruit several-seeded.	J. chinensis.
	Fruit 1- or 2-seeded. (Red Cedar).	J. virginiana.

Subdivision ANGIOSPERMAE. Enclosed-Seed Plants.

Class MONOCOTYLEDONEAE. "Endogens."

Family GRAMINEAE. Grass Family.

A very large widespread and highly important family of rarely woody plants, furnishing the principal grains and sugar of

the world, indispensable for the maintenance of lawns, etc. Several large species are frequently used in massed planting and some few of these, not easily defined, with woody switch-like stems, constitute the bamboos of temperate borders.

Family LILIACEAE. Lily Family.

A large family, chiefly of herbs, comprising many of the "Dutch bulbs," "smilax," "asparagus fern" and other greenhouse and bedding plants, onions, asparagus, of the vegetable garden, and the dracaenas, yuccas, etc., of warm regions.

SMILAX. Greenbrier.

Mostly deciduous woody plants climbing by stipular tendrils, with " endogenous" wood lacking pith and medullary rays; moderately slender green often striate or angled mostly prickly stems; alternate raised ragged petiole-bases rather than leaf-scars; conical buds with a single exposed scale; ovate to oblong entire or somewhat prickly-toothed or lobed leaves with tendrils on their petioles; small dioecious greenish polypetalous flowers in stalked axillary clusters; and small few-seeded dark berries.

1. Leaves whitened beneath. 2.
   Leaves not whitened beneath. 3.
2. Leaves ovate. S. glauca.
   Leaves oblong. S. laurifolia.
3. Leaves not lobed. 4.
   Leaves often halberd-shaped or 3-lobed. S. Bona-nox.
4. Fruit black. S. rotundifolia.
   Fruit red. S. Walteri.

Class DICOTYLEDONEAE. "Exogens."

Family SALICACEAE. Willow Family.

A small family of deciduous trees and shrubs, chiefly of temperate or cold regions, yielding the "osiers" used in basketry and some lumber of inferior quality. Some of the poplars greatly abused in street planting.

POPULUS. Polar. Aspen.

Deciduous trees often very rough-barked when old, with rather soft white or browning wood with minute scattered ducts and very fine medullary rays; moderate rounded or acutely 5-angled twigs; 5-angled continuous brown pith; somewhat raised rather 3-lobed large leaf-scars with 3 large bundle-traces; narrow stipule-scars; large buds, the terminal angularly ovoid, the lateral often falcately spreading, with several scales of which the lowermost is in front, immediately over the leaf-scar; small dioecious naked flowers in catkins; and small ovoid capsules with numerous cottony seeds.

1. Buds plump, not resinous or gummy. 2.
   Buds elongated, more or less balsamiferous. 9.
2. Leaves white- or gray-woolly beneath: petioles little flattened. (White Poplars). 3.
   Leaves not woolly: petioles much flattened. (Aspens). 6.
3. Leaves gray beneath. P. canescens.
   Leaves white beneath. 4.
4. Tree rounded or oblong. 5.
   Tree pyramidal. P. alba Bolleana.
5. Leaves coarsely toothed rather than lobed. P. alba.
   Leaves deeply lobed. P. alba nivea.
6. Leaves glabrate and nearly entire. P. tremuloides.
   Leaves somewhat pubescent, coarsely toothed. 7.
7. Buds gray-pubescent. P. grandidentata.
   Buds glabrate. 8.
8. Not weeping. P. Tremula.
   With hanging branches. P. Tremula pendula.
9. Leaves pale beneath: petioles little flattened: buds mostly very balsamiferous. (Balsams). 10.
   Leaves green beneath: petioles much flattened: buds less balsamiferous. (Cottonwoods). 14.
10. Leaves deeply heart-shaped, broad. P. candicans.
    Leaves scarcely heart-shaped. 11.
11. Leaves elliptical or ovate. 12.
    Leaves lanceolate. 13.

12. Leaves flat. P. balsamifera.
Leaves wavy. P. laurifolia.
13. Twigs sharply angled. P. Lindleyana.
Twigs not angled. P. fortissima.
14. Tree round-topped. 18.
Tree oblong. × P. Eugenei.
Tree pyramidal. P. nigra italica.
15. Leaves rather cuneate and attenuate. P. nigra.
Leaves deltoid. 16.
16. Buds glabrous. P. deltoides monilifera.
Buds velvety. P. Sargentii.

SALIX. Willow. Osier.

Deciduous shrubs or trees with light brown wood with numerous minute scattered ducts and very fine medullary rays; round continuous pale pith; chiefly alternate sessile appressed oblong buds with a single exposed scale standing directly over the leaf-scar, the end-bud lacking; shallow U-shaped or transverse low leaf-scars with 3 bundle-traces; small if any stipule-scars; usually narrow rather small short-petioled leaves; dioecious naked flowers in catkins; and small flask shaped stalked capsules with numerous cottony seeds.

1. Leaves green and glabrate on both sides, narrow. S. nigra.
Leaves whitened beneath. 2.
2. Leaves woolly beneath. 3.
Leaves finally glabrous, or else silky beneath. 5.
3. Leaves narrow, revolute. S. incana.
Leaves broad, often crisped: catkins large. 4.
4. Not weeping. S. caprea.
Weeping. S. caprea pendula.
5. Leaves broad, veiny beneath. 6.
Leaves narrow or elongated. 7.
6. Young catkins large, (Pussy Willow). S. discolor.
Catkins small and slender. S. cordata.
7. Leaves glabrous, little whitened beneath. S. fragilis.
Leaves silky or else distinctly white beneath. 8.

8. Leaves white-silky on both faces. S. alba.
   Leaves glabrate above. 9.
9. Twigs golden yellow. S. vitellina.
   Twigs green: habit weeping. S. babylonica.

Family MYRICACEAE. Bayberry Family.

A small family of shrubs or small trees with aromatic foliage, the wax which encrusts the fruit of some species used in a small way for making candles.

MYRICA. Bayberry.

Deciduous mostly aromatic shrubs or small trees with reddish rather hard wood with minute scattered ducts and fine medullary rays; slender twigs; continuous irregular pith; alternate half-round low small leaf-scars with 3 bundle-traces; no stipule-scars; round sessile buds with about 3 exposed scales; oblong entire or coarsely few-toothed or deeply and regularly lobed leaves with golden glands beneath; small naked imperfect flowers in short catkins; and small rounded aggregates of dry fruits often very waxen.

1. Leaves elongated, deeply lobed. (Sweetfern). M. asplenifolia.
   Leaves short, toothed toward the end or entire. 2.
2. Leaves much narrowed at base: low shrub. 3.
   Leaves oblanceolate. 4.
3. Leaves pubescent beneath. M. Gale.
   Leaves glabrate. M. Gale subglabra.
4. Leaves characteristically obtuse: shrubby. M. carolinensis.
   Leaves more acute: rather tree-like. M. cerifera.

Family LEITNERIACEAE. Corkwood Family.

A family consisting of only the following genus with a single species of no decorative value but sometimes grown as a curiosity because of its extremely light wood.

LEITNERIA. Corkwood.

Deciduous little-branched swamp shrubs with rather stout terete twigs; very light pale wood with moderate ducts in short subtangential series and very fine medullary rays; rounded con-

tinuous white pith; alternate little raised half-elliptical or triangular leaf-scars with 3 bundle-traces; no stipule-scars; ovoid sessile buds with several exposed scales; moderate entire petioled leaves; dioecious apetalous flowers in catkins; and dry drupe-like wrinkled fruit.

Leaves lance-elliptical, hairy beneath. L. floridana.

Family JUGLANDACEAE. Walnut Family.

A small widespread family furnishing most of the nuts of commerce and the important hard woods hickory and walnut; sometimes planted for shade trees.

JUGLANS. Walnut, Butternut.

Deciduous mostly large trees with brown wood with moderate fairly uniform diffused ducts and fine medullary rays with tangential bands of wood parenchyma; stout roundish twigs; rather heart-shaped triangular or 3-lobed large leaf-scars with 3 crescent-shaped or compound bundle-traces; no stipule-scars; superposed buds with several, sometimes lobed, scales; large odd-pinnate leaves; small monoecious apetalous flowers in catkins; and large nuts with hard shell enclosed by an indehiscent fleshy pericarp.

1. Leaf-scars with a downy cross-line at top. 2.
   Leaf-scars without a downy ridge at top, notched. 3.
2. Twigs moderate: leaf-scars not notched. J. cinerea.
   Twigs stout: leaf-scars notched. (Japanese). J. Sieboldiana.
3. End buds elongated: nuts small. J. rupestris.
   End buds scarcely longer than thick: nuts large.
4. Buds ashen-pubescent. (Black walnut). J nigra.
   Buds glabrate. (European walnut). J. regia.

PTEROCARYA.

Deciduous trees with pale wood with rather sparse and small diffused ducts and fine medullary rays with wood-parenchyma cross lines; moderately stout terete twigs; somewhat 5-sided brownish chambered pith; alternate somewhat raised obtusely triangular or 3-lobed leaf-scars with 3 compound bundle-traces; no stipule-scars; scaly and solitary, or naked and superposed

buds, the uppermost sometimes long-stalked; large odd-pinnate leaves with toothed leaflets; inconspicuous monoecious apetalous flowers in catkins; and variously winged nut-like fruits.

1. Buds naked. 2.
   Buds scaly. P. rhoifolia.
2. Rachis of leaves winged. P. stenoptera.
   Rachis not winged. P. fraxinifolia.

CARYA. Hickory.

Rather large deciduous trees with mostly rough bark; hard finally often reddish or brownish wood with the ducts crowded and large in the spring growth but usually smaller or sparser later in the season, and very fine medullary rays connected by equally heavy cross-lines of wood parenchyma; mostly stout terete twigs; rather large roundish essentially homogeneous sometimes dark pith; alternate low shield-shaped large leaf-scars with 3 more or less confluent groups of bundle-traces; no stipule scars; alternate ovoid often superposed rather large buds sometimes stalked or developing the first season; large odd-pinnate leaves; small green monoecious apetalous flowers in catkins or small clusters; and rather large nuts with loose usually dehiscent husk. (*Hicoria*).

1. Bud-scales in pairs, sometimes developing into small leaves: lateral buds often stalked. (Pecans and Bitternuts). 2.
   Bud-scales not in opposite pairs. 3.
2. Twigs and buds with yellow glands: nut scarcely elongated, mamillated, very thin-shelled, very bitter. C. cordiformis.
   Twigs scarcely glandular: nut longer than thick, rather firm-shelled, not bitter. (Pecan). C. Pecan.
3. Terminal bud small (scarcely 10 mm. long). (Pignuts). 4.
   Terminal bud large (usually over 10 mm.). (Hickories). 5.
4. Leaves glabrate: bark not deeply fissured. C. ovalis.
   Leaves hairy: bark deeply fissured into squares. C. villosa.
5. Outer bud-scales falling: not shaggy. (Mocker nut). C. alba.
   Outer scales persistent, pointed: bark shaggy. 6.
6. Twigs buff or orange: leaflets 7-9. (King nut). C. laciniosa.
   Twigs gray or reddish: leaflets usually five. 7.

7. Twigs glabrate. (Shagbark hickory). C ovata.
Twigs persistently hairy. C. ovata hirsuta.

Family BETULACEAE. Birch Family.

A small family chiefly of cold regions, furnishing some important lumber and the hazel nuts and filberts of commerce; much planted for single tree effect.

CORYLUS. Hazel. Filbert.

Deciduous shrubs with light brown wood with minute ducts in radial or flame-like patterns and very fine medullary rays; moderately slender rounded often bristly twigs; roundish homogeneous pale pith; alternate low crescent-shaped leaf-scars with 3 often compound bundle-traces; narrow stipule-scars; ovoid buds with half-a-dozen exposed scales; rather large broad but pinnately veined stalked simple leaves; inconspicuous monoecious apetalous flowers in catkins; and light brown hard-shelled rather small nuts in green or membranaceous husks.

1. Husk of 2 nearly or quite separate bracts. 2.
Husk tubular. 8.
2. Husk bur-like. C. ferox.
Husk unarmed. 3.
3. Husk parted into linear divisions. C. colurna.
Husks with broader divisions. 4.
4. Husk open, hardly longer than the short nut. 5.
Husk closely applied to and surpassing the nut. C. americana.
5. Leaves laciniate. C. Avellana laciniata.
Leaves not deeply parted. 6.
6. Rather upright. 7.
Branches drooping. C. Avellana pendula
7. Leaves green. (European hazel). C. Avellana.
Leaves yellow. C. Avellana aurea.
Leaves purple. C. Avellana atropurpurea.
8. Husk merely pubescent: nut elongated. 9.
Husk bristly. C. rostrata.
9. Leaves green. (Filbert). C. maxima.
Leaves purple. C. maxima purpurea.

OSTRYA. Hop Hornbeam.

Deciduous small trees with scaly bark: somewhat reddish hard wood with minute diffused ducts and fine medullary rays; slender somewhat zig-zag terete twigs; roundish homogeneous pale pith; alternate 2-ranked somewhat raised small crescent-shaped leaf scars with 3 bundle-traces; narrow stipule-scars; elongated ovoid moderate solitary sessile buds with several spirally placed finely ridged scales, the end bud lacking; simple serrate petioled moderate leaves; inconspicuous monoecious apetalous flowers in small catkins; and small seed-like fruits, each subtended by a larger thin scale, aggregated in a hop-like cluster.

Twigs from villous and glandular, glabrescent. O. virginiana.

CARPINUS. Hornbeam. Blue Beech.

Deciduous small trees with fluted trunks; smooth gray bark; pale hard wood with minute diffused ducts and extremely fine medullary rays; slender zig-zag terete twigs; rather round homogeneous pale pith; alternate 2-ranked low small crescent-shaped leaf-scars with 3 bundle-traces; narrow stipule-scars; elongated-ovoid rather small solitary sessile buds with several spirally placed smooth scales, the end bud lacking; simple doubly serrate petioled moderate leaves; inconspicuous monoecious apetalous flowers in small catkins; and small ribbed seed-like fruits, each subtended by a hastate bract.

1. Buds small (3 mm.), dark, for a time hairy. C. caroliniana.
   Buds large (5 mm.), light brown, glabrous. 2.
2. Tree round-topped. 3.
   Tree conical. C. Betulus pyramidalis.
3. Leaves green. 4.
   Leaves for a time purple. C. Betulus purpurea.
4. Leaves merely toothed. C. Betulus.
   Leaves cut or lobed. C. Betulus incisa.

BETULA. Birch.

Deciduous trees or occasionally shrubs often with papery-flaking or white bark with transversely elongated lenticels; pale or reddish often hard wood with minute diffused ducts and very

fine medullary rays; mostly very slender terete twigs; small 3-sided or flattened homogeneous greenish pith; alternate, often 2-ranked low rather crescent-shaped leaf-scars with 3 bundle-traces, short narrow evanescent stipule-scars; ovoid or oblong sessile solitary buds, the terminal sometimes absent and the lateral rather appressed with about 6 alternate exposed scales; simple usually toothed petioled leaves; small imperfect inconspicuous apetalous flowers in catkins; and small 2-winged fruits in cone-like catkins with deciduous 3-lobed scales.

1. Shrubs. 2.
   Trees. 4.
2. Leaves glabrous. 3.
   Leaves pubescent, dentate. B. pumila.
3. Twigs glandular-warty. B. glandulosa.
   Twigs not glandular-roughened. B. nana.
4. Bark cherry-like, wintergreen-flavored. B. lenta.
   Bark flaking, or white or yellowish. 5.
5. Bark gray or yellow or orange. 6.
   Bark white. 7.
6. Leaves ovate: bark gray or yellowish. B. lutea.
   Leaves rhombic: bark orange. B. nigra.
7. Leaves triangular. B. populifolia.
   Leaves ovate. 8.
8. Bark mostly flaking: leaves large (4 12 cm.). B. papyrifera.
   Bark not flaking: leaves small (2-6 cm. long). 9.
9. Leaves green. 10.
   Leaves purple. B. pendula purpurea.
10. Leaves not lobed. 11.
    Leaves lobed or cut. 12.
11. Scarcely weeping or pyramidal. B. pendula.
    Weeping. B. pendula tristis.
    Narrowly conical. B. pendula fastigiata.
12. Scarcely weeping. B. pendula dalecarlica.
    Weeping. B. pendula gracilis.

ALNUS. Alder.

Rather ovoid much branched deciduous tree, or more often seen as shrubs, with rather smooth bark; brownish rather hard

wood with minute diffused ducts and occasional thick medullary rays accompanying the prevalent very fine ones; rather slender often 3-sides twigs with 3-sided or flattened homogeneous pith; alternate crescent-shaped or half round somewhat raised leaf scars with 3 bundle-traces (or the lowermost broken into a secondary group) in a single series; 3-ranked stalked plump buds with about 3 exposed scales; rounded or ovate or somewhat lanceolate denticulate or once or twice serrate petioled simple leaves; small monoecious apetalous flowers in catkins or cone-like clusters often evident in winter; and minute nutlets in a woody cone.

1. Leaves doubly serrate. 2.
   Leaves simply toothed, or lobed. 3.
2. Leaves glaucous beneath. A. tinctoria.
   Leaves green beneath. A. rugosa.
3. Leaves obtuse. 4.
   Leaves pointed. A. japonica.
4. Leaves dentate or lobed, rather acute-based. 5.
   Leaves closely serrulate, very round-based. A. Mitchelliana.
5. Leaves lobed. A. glutinosa laciniata.
   Leaves merely dentate. 6.
6. Leaves green. 7.
   Leaves yellow. A. glutinosa aurea.
7. Leaves not red-veined. A. glutinosa.
   Leaves red-veined. A. glutinosa rubrinervia.

Family FAGACEAE. Beech Family.

A widespread family, especially in temperate regions, comprising few genera but numerous species; the source of such "hard-woods" as beach and oak, the chestnuts of commerce, and much used for single tree effects and occasionally as street trees.

FAGUS. Beech.

Finally large deciduous trees with normally smooth light gray bark; brownish rather hard wood with minute diffused ducts and fine medullary rays with frequent much heavier intervening rays; terete moderately slender rather zig-zag twigs;

rather 3-sided homogeneous pith; alternate 2-ranked somewhat raised crescent-shaped leaf-scars with 3 simple or compound bundle-traces; narrow stipule-scars nearly meeting around the twig; fusiform pungent long and obliquely spreading buds with many scales; rather low-toothed moderate stalked leaves often clustered on spurs; small monoecious apetalous flowers in stalked head-like axillary catkins; and small 3-sided brown nuts solitary in bristly dehiscent husks.

1. Leaves rather blunt, minutely toothed. 2.
   Leaves sharply toothed. (American beech). F. grandifolia.
   Leaves lobed. 5.
2. Round-topped. 3.
   Pyramidal. F. sylvatica pyramidalis.
   Weeping. 4.
3. Leaves green. (European beech). F. sylvatica.
   Leaves yellow. F. sylvatica Zlatia.
   Leaves purple. F. sylvatica purpurea.
4. Leaves purple. F. sylvatica purpurea pendula.
   Leaves green. F. sylvatica pendula.
5. Bark dark, rough. F. sylvatica quercoides.
   Bark gray, smooth. 6.
6. Leaves rather sinuate. F. sylvatica quercifolia.
   Leaves moderately incised. F. sylvatica incisa.
   Leaves very deeply incised. F. sylvatica heterophylla.

CASTANEA. Chestnut.

Deciduous shrubs or mostly trees with fissured gray bark; rather soft brown wood with very large ducts crowded in the spring growth and minute ducts in flame-shaped patterns in the summer growth, and very fine medullary rays; moderately stout usually fluted moderate twigs; angled homogeneous pale pith; alternate moderate crescent-shaped somewhat raised leaf-scars with a number of bundle-traces scattered or unequally clustered in 3 groups; unequal stipule-scars; ovoid solitary sessile buds—the terminal sometimes absent, with about 2 exposed scales; simple rather large stalked sharply serrate leaves; small monoecious apetalous flowers, the staminate in catkins, and

brown thin-shelled nuts, 1 or several in a prickly dehiscent bur.

1. Mature leaves essentially glabrous beneath. 2.
   Mature leaves pubescent beneath, or petioles pubescent. 4.
2. Young leaves glabrate, acute at base. (American). C. dentata.
   Young leaves stellate-tomentose beneath. 3.
3. Leaves acute at base. (European chestnut). C. sativa.
   Leaves rounded or subcordate at base. (Japanese). C. crenata.
4. Petiole villous: nuts several in the bur. C. mollissima.
   Petiole not villous: nut solitary. (Chinquapin). C. pumila.

QUERCUS. Oak.

In our region deciduous trees, or exceptionally shrubs, with yellowish or red-brown hard ring-porous wood with the smaller ducts radially arranged, fine medullary rays, with transverse bands of wood parenchyma and frequent very heavy intervening rays; slender or moderate usually fluted twigs; moderate 5-angled continuous pith; alternate rather small half-round somewhat raised leaf-scars with half a dozen scattered bundle-traces; minute stipule-scars or filiform persistent stipules; sessile ovoid or conical buds crowded toward the tip, with a considerable number of scales; entire or toothed or mostly pinnately lobed petioled leaves; monoecious small apetalous flowers, in catkins or axillary; and nut-like fruit with a scaly cup at the base.

1. Leaves entire. 2.
   Leaves coarsely toothed. 3.
   Leaves distinctly lobed. 5.
2. Leaves narrow (under 25 mm. wide), glabrous. Q. Phellos.
   Leaves broad (often 50 mm.), downy beneath. Q. imbricaria.
3. Shrub: leaves sharp-toothed, downy beneath. Q. prinoides.
   Trees: leaves downy beneath. 4.
4. Leaves with sharp teeth: fruit sessile. Q. Muhlenbergii.
   Leaves with blunt teeth: fruit long-stalked. Q. bicolor.
5. Lobes blunt, never bristle-tipped. 6.
   Lobes acute, ending in bristles. 10.
6. Leaves pubescent beneath: twigs buff. Q. macrocarpa.
   Leaves glabrous or nearly so. 7.

7. Buds conical or pyramidal, gray-pubescent. 8.
   Buds round or ovoid: entirely glabrous. Q. alba.
8. Leaves auricled at base, glabrous. 9.
   Leaves not auricled, midrib sometimes hairy. Q. sessiliflora.
9. Round-topped. Q. Robur.
   Columnar. Q. Robur fastigiata.
10 Buds essentially glabrous. 11.
   Buds pubescent: lobes of leaves widened upwards. 13.
11. Buds large (often 4×7 mm.). 12.
   Buds small (scarcely 3×4 mm.). Q. palustris.
12. Lobes of leaves narrowed upward, dull. Q. rubra.
   Lobes of leaves widened upward, glossy. Q. coccinea.

Family MORACEAE. Mulberry Family.

A family of few genera and, except for the tropical figs, few species, with milky juice: constituting the principal source of India rubber and producing the edible mulberries and figs. The Osage orange is extensively used for hedges.

MACLURA. Osage Orange. "Hedge."

Deciduous milky-juiced small trees with rough-ridged bark, that of the roots peeling in light orange flakes; hard light brown wood with the vernal ducts larger and crowded and those of summer in a wavy tangential pattern; somewhat raised half-round or 3-sided leaf-scars with bundle-traces aggregated in a broken ellipse; no stipule scars; subglobose buds with several exposed scales, usually producing a spine from the axil of one; moderate petioled leaves often clustered on short spurs; dioecious apetalous flowers in stalked catkins or heads; and very large aggregate green fruit with fleshy sepals and seed-like akenes. *(Toxylon).*

Leaves lance-ovate: fruit 5-10 cm. M. pomifera.

BROUSSONETIA. Paper Mulberry.

Deciduous trees with rather smooth mottled bark; milky sap; yellowish white soft wood with numerous rather large ducts in the spring growth and smaller diffused ones in the later growth, marked tangential pattern of wood parenchyma in

the autumn growth, and distinct medullary rays; moderate terete twigs; round homogeneous pale pith; alternate or exceptionally opposite half-round or elliptical leaf-scars with a sometimes very indistinct crescent-shaped bundle-trace; no stipule-scars; ovoid appressed sessile solitary buds, the terminal small, with 2 or 3 exposed scales; ovate toothed or lobed rather large petioled leaves; dioecious inconspicuous apetalous flowers in catkins or small heads; and small aggregated drupelets.

1. Leaves alternate. 2.
   Leaves uniformly opposite. B. papyrifera contraria.
2. Leaves flat. 3.
   Leaves concave. B. papyrifera cucullata.
3. Leaves at most with few coarse lobes. 4.
   Leaves dissected into narrow divisions. B. papyrifera dissecta.
4. Fruit red. B. papyrifera.
   Fruit white. B. papyrifera leucocarpa.

MORUS. Mulberry.

Deciduous trees with gray-brown bark; milky sap; brown rather soft wood with small ducts somewhat larger and crowded in the late vernal growth and distinct medullary rays connected by transverse lines of wood parenchyma; rather slender terete twigs; roundish continuous pale pith; alternate often 2-ranked half-round somewhat raised leaf-scars with 7 or more bundle-traces scattered or in an ellipse; unequal stipule scars; no end bud, the ovoid sessile lateral buds with about 6 exposed scales; broadly ovate serrate or deeply and unequally lobed petioled leaves; small imperfect apetalous flowers in catkin- or head like clusters, and rather small aggregate fruits with fleshy sepals.

1. Buds spreading: scales dark-margined: leaves rough above. 2.
   Buds appressed, uniformly colored: leaves nearly smooth. 3.
2. Leaves dull, not very pubescent. (Red mulberry). M. rubra.
   Leaves glossy above, tomentose beneath. M. rubra tomentosa.
3. Leaves rather exceptionally lobed. (White mulberry). M. alba.
   Leaves mostly lobed. 4.
4. Leaves cuneate, toothed, white-veined. M. alba nervosa.
   Leaves rather regularly lobed. 5.

5. Not weeping. (Tartarian mulberry). M. alba tatarica.
   Weeping. (Teas' mulberry). M. alba pendula.

FICUS. Fig.

Deciduous shrubs or trees (of large size and unusual habit in the tropics, or with persistent leaves and sometimes climbing by roots as in forms cultivated under glass), with milky sap; rather stout terete twigs; round continuous pith diaphragmed at the nodes; alternate somewhat raised rather large rounded leaf-scars with 3 compound bundle-traces; narrow stipule-scars encircling the twigs; rounded subsessile solitary buds, with half-a-dozen or so scales when fertile, the vegetative buds pointed and with 1 scale; simple mostly long-stalked leaves; minute imperfect apetalous flowers concealed in the large hollow receptacle; and fleshy hypanthium containing numerous small seed-like akenes.

Leaves palmately nerved, often deeply lobed. F. Carica.

Family ULMACEAE. Elm Family.

A rather small family of little economic value except that some of the elms furnish the finest of shade- and street-trees, and lumber is obtained from elms and hackberry.

ULMUS. Elm.

Deciduous often very deliquescent trees with pale or usually brown tough wood with small ducts usually larger and more crowded in spring but minute and in tangential patterns in autumn, and fine medullary rays; slender terete or winged twigs; small rounded continuous pith; alternate 2-ranked half-round or half-elliptical somewhat raised leaf-scars with 3 bundle-traces; transverse stipule scars; sessile ovoid buds with a number of 2-ranked scales, the terminal absent; short-petioled oblique toothed moderate leaves; small perfect apetalous clustered flowers appearing before the foliage; and round samaras.

1. Leaves once serrate, small (scarcely 5 cm. long). 2.
   Leaves doubly serrate. 3.
2. Not weeping. U. pumila.
   Weeping. U. pumila pendula.

3. Twigs not corky-winged. 4.
   Twigs often warty or corky-winged. 12.
4. Buds glabrous. 5.
   Buds pubescent. 9.
5. Flowers stalked: fruit glabrous except the edge. 6.
   Flowers nearly sessile: fruit pubescent. U. campestris.
6. Trees. 7.
   Shrub. U. americana nana.
7. Leaves green. 8.
   Leaves yellow. U. americana aurea.
8. Not weeping. (White elm). U. americana.
   Somewhat weeping. U. americana pendula.
9. Twigs bristly: buds red-hairy. (Slippery elm). U. fulva.
   Twigs and buds soft-pubescent. 10.
10. Leaves green. 11.
    Leaves purple. U. glabra atropurpurea.
11. Not weeping. (Scotch elm). U. glabra.
    Weeping. U. glabra camperdownii.
12. Flowers slender-stalked. 13.
    Flowers nearly sessile. Forms of U. campestris.
13. Buds glabrous: corky wings thin. U. alata.
    Buds pubescent: twigs coarsely corky. U. racemosa.

PLANERA. Planer Tree.

Deciduous small trees with somewhat brownish wood with minute ducts sometimes in evident tangential lines, and fine medullary rays; slender terete zig-zag twigs; small rounded continuous pith; alternate 2-ranked half-round somewhat raised leaf-scars; sessile round-ovoid buds with several 2-ranked scales, the end-bud absent; short-petioled sometimes oblique rather small and thick toothed leaves; small perfect apetalous clustered flowers appearing before the foliage; and small rounded blunt-spiny fruit.

Leaves ovate, unequally biserrate. P. aquatica.

ZELKOVA.

Deciduous rather small trees with slender twigs; small pith; alternate 2-ranked scarcely raised half-elliptical leaf-scars with

3 bundle-traces; minute transverse stipule scars; ovoid sessile often collaterally multiple buds with half-a-dozen exposed scales in several ranks; short-petioled oblique toothed rather small leaves; inconspicuous often imperfect apetalous flowers; and small drupe-like fruits.

1. Leaves large (4 × 8 cm.), acuminate. Z. serrata.
   Leaves smaller (scarcely 3 × 6 cm.), not acuminate. 2.
2. Leaves lanceolate, rather long (4-5 cm.). Z. Davidii.
   Leaves elliptical or ovate, short (3-4 cm.). Z. ulmoides.

CELTIS. Hackberry.

Rather ovoid much branched deciduous trees, or occasionally shrubs, with variously roughened or warty bark; hard pale or red-brown wood with a vernal zone of medium-sized ducts and smaller summer ducts in a wavy transverse pattern, and fine medullary rays; slender sometimes grooved sympodial zig-zag twigs with somewhat angular pale pith chambered in places; alternate 2-ranked appressed small buds with several 2-ranked scales; crescent-shaped leaf-scars with 3 bundle-traces; minute stipule-scars; ovate lanceolate truncately or cordately oblique moderate-sized often serrate simple leaves; small monoecious greenish apetalous flowers solitary or few together; and small sugary drupes with reticulate or pitted stone.

1. Trees. 2.
   Shrubs: buds small. C. pumila.
2. Leaves entire and glabrous: buds small. C. mississippiensis.
   Leaves toothed or pubescent: buds larger. C. occidentalis.

Family ARISTOLOCHIACEAE. Birthwort Family.

A rather small family, chiefly of herbs, of little use except that species of Aristolochia (*e.g.* the goose-flower) are often grown under glass for their large or peculiar, usually ill-scented, flowers.

ARISTOLOCHIA. Dutchman's Pipe.

Woody twiners (as here considered) with brown wood with large diffused ducts and broad wedge-shaped medullary rays; for a time green sympodial stems swollen at the nodes; pale

homogeneous roundish pith; rounded alternate superposed few-scaled small buds encircled by the leaf-scar; U-shaped leaf-scars with 3 bundle-traces; no stipule-scars; simple large cordate leaves; axillary perfect pipe-shaped apetalous epigynous flowers, green with brown or lurid throat; and rather large hanging basket-like capsules with flat seeds.

Glabrate: flower with smooth segments. A. macrophylla.
Velvety: flower with rugose segments. A. tomentosa.

Family CARYOPHYLLACEAE. Pink Family.

A rather large family of herbaceous plants much used in flower-gardening and including the "carnation" of florists: the following and some other dense-growing species occasionally employed in rock-gardens.

SILENE. Moss Campion.

Mostly perennial herbs with opposite sessile leaves; no stipules; mostly perfect "pink"-like polypetalous flowers with 3 carpels; and 1- or partly 3-celled many-seeded capsules dehiscing at the top.

Low, matted, with crowded linear leaves. S. acaulis.

Family CERCIDIPHYLLACEAE.

An Asiatic family including only the following genus with a single species, forming an attractive small tree.—Sometimes merged in the Trochodendraceae.

CERCIDIPHYLLUM.

Deciduous trees with slender twigs widened at the nodes; close-grained wood with minute diffused ducts and fine medullary rays; somewhat angular continuous small pith; opposite or obliquely opposite raised half-elliptical or somewhat 3-lobed leaf-scars with 3 bundle-traces; no stipule-scars; appressed oblong sessile buds with 1 or 2 exposed scales; palmately nerved petioled rather crenate round-cordate leaves; small dioecious apetalous solitary flowers; and oblong many-seeded capsules.

Leaves glabrous. C. japonicum.
Leaves somewhat pubescent beneath. C. japonicum sinense.

Family RANUNCULACEAE. Buttercup Family.

A large family, chiefly herbaceous, of no great economic use but often becoming troublesome weeds; the paeonies and virgin's bowers are largely planted.

PAEONIA. Paeony.

Usually herbs and not evergreen, with alternate pinnately parted large leaves; large white or red polypetalous perfect flowers; and fruit of several often large follicles each with several large seeds.

Not woody: ovaries not sheathed. Herbaceous paeonies.
Soft-woody: ovaries sheathed at base. P. suffruticosa.

CLEMATIS. Virgin's Bower.

More or less woody plants mostly climbing by their persistent leaf-stalks, with 6-sided or ribbed slender stems; soft wood with large crowded vernal ducts, few and minute summer ducts, and coarse wedge-shaped medullary rays; relatively large roundish homogeneous pale pith; opposite mostly pinnate stalked leaves with the leaflets not falling from a distinct scar when deciduous; axillary solitary or clustered usually perfect often very large apetalous flowers with corolla-like calyx; and large akenes with long often feathery style.

1. Leaves simple. 2.
   Leaves compound. 6.
2. Leaves entire. 3.
   Leaves toothed: not climbing. C. Fremont'i.
3. Flowers creamy: not climbing. C. ochroleuca.
   Flowrs blue or purple. 4.
4. Not climbing: flowers small, urn-shaped. C. integrifolia.
   Climbing: flowers large and open. C. lanuginosa.
5. Leaflets entire. 6.
   Leaflets toothed. 12.
6. Flowers urn-shaped, small. 7.
   Flowers open. 9.
7. Styles hairy in fruit. 8.
   Styles not feathery. C crispa.

8. Flowers bluish or purple.	C. Viorna.
Flowers red.	C. texensis.
9. Styles feathery in fruit. 10.	
Styles without hairs.	C. Viticella.
10. Flowers small (scarcely 2 cm.), fragrant.	C. paniculata.
Flowers large (some 8 cm.). 11.	
11. Flowers longer than their stalks.	C. lanuginosa.
Flowers shorter than their stalks.	C. patens.
12. Leaves only once compound. 13.	
Leaves often bipinnate, half-evergreen.	C. Flammula.
13. Leaflets only 3: flowers dioecious.	C. virginiana.
Leaflets often more than 3: flowers perfect.	C. Vitalba.

ZANTHORHIZA. Yellowroot.

Small simple shrubs with rather slender soft-wooded stems; somewhat angular continuous pale pith; narrow transverse low leaf-scars with about 7 bundle-traces; no stipule scars; solitary buds with few exposed scales; long-stalked pinnate leaves clustered at end of the season's growth; small flowers in openly branched racemes; and small-seeded follicles.

Leaflets incisely serrate or parted. Z. apiifolia.

Family LARDIZABALACEAE.

A small family, often included in Berberidaceae, of no great use except for the effective climber here considered.

AKEBIA.

Deciduous woody twining plants with rather slender green stems; roundish homogeneous pith; alternate much raised crescent-shaped leaf-scars with several irregularly placed bundle-traces at point of breakage, but reduced to 3 in a single series near the stem; no stipule-scars; acute ovoid sessile divergent buds with a dozen exposed scales; long-petioled digitate leaves of 5 stalked leaflets; rather small functionally dioecious lurid polypetalous flowers racemed from the nodes; and rather large dehiscent fruit with numerous small seeds immersed in the placental pulp.

Leaflets 5, nearly entire, notched at apex. A. quinata.

Family BERBERIDACEAE. Barberry Family.

A small family some shrubs of which are much used in landscape work. The common barberry is often viewed with disfavor because, if infected with the cluster-cup fungus (*Aecidium*), it spreads black rust (*Puccinia*) to wheat.

BERBERIS. Barberry.

Deciduous or in other species evergreen shrubs with hard yellow wood with minute diffused ducts slightly larger in spring, and fine medullary rays; slender angular monopodial branches with roundish homogeneous pith; alternate 5-ranked ovoid buds with several scales; crescent-shaped raised leaf-scars typically with 3 bundle-traces; rather small apparently simple (unifoliolately compound) leaves often clustered on spurs or replaced by 1- to 3-pronged spines on shoots; small perfect polypetalous yellow flowers clustered in the axils or racemed; and small ellipsoid or oblong usually 1-seeded berries.

1. Leaves entire: flowers or fruits usually solitary on a stalk. (Japanese barberry). B. Thunbergii.
   Leaves distinctly toothed. 2.
2. Leaves green. 3.
   Leaves purple. 4.
   Leaves variegated. 5.
3. Fruit red or purplish. (Common barberry). B. vulgaris.
   Fruit yellow. B. vulgaris lutea.
   Fruit white. B. vulgaris alba.
4. Leaves of ordinary size (2 × 4 cm.). B. vulgaris atropurpurea.
   Leaves distinctly larger. B. vulgaris macrophylla.
5. Leaves white-marked. B. vulgaris albo-variegata.
   Leaves yellow-bordered. B. vulgaris aureo-marginata.

MAHONIA.

Evergreen shrubs with rather hard wood with minute ducts in flame-like pattern, and unequal coarse wedge-shaped medullary rays; rounded continuous pith; alternate somewhat raised U-shaped leaf-scars with some 15 bundle-traces; no stipule-scars; ovoid terminal buds with numerous rather persistent hard pointed scales; odd-pinnate leaves with veiny pungent toothed

and often crisped leaflets; small perfect polypetalous yellowish racemed flowers; and blue glaucous small one-seeded berries. - Often placed in *Berberis*.

1. Leaves distinctly stalked: leaflets about five. 2.
   Leaves nearly sessile: leaflets about nine. 6.
2. Rather tall. 3.
   Dwarf and spreading. M. repens.
3. Leaves glossy bright green. M. Aquifolium.
   Leaves becoming yellow. M. Aquifolium lutescens.
   Leaves mottled with red. M. Aquifolium amabilis.
   Leaves spotted. 4.
4. Variegation white. M. Aquifolium albo-variegata.
   Variegation yellow. 5.
5. Spots large and scattered. M. Aquifolium aureo-variegata.
   Spots small and numerous. M. Aquifolium aucubifolia.
6. Leaflets gray-green. M. pinnata.
   Leaflets bright green. M. pinnata Wagneri.

Family MENISPERMACEAE. Moonseed Family.

A small family of climbing plants, of little general use.

CALYCOCARPUM. Cupseed.

Half woody twining plants with slender rather fluted green stems; rounded homogeneous pith; alternate somewhat raised small crescent-shaped leaf-scars with 1 bundle-trace; small often superposed buds; no stipule-scars; rather large long-stalked palmately lobed leaves with rounded sinuses; small imperfect polypetalous flowers in stalked axillary clusters; and berry-like drupe with a large cup-like stone.

Lobes acuminate, sinuses part-elliptical. C. Lyoni.

COCCULUS. Carolina Moonseed.

Half-woody twining plants with somewhat fluted stems; rounded homogeneous pith; alternate slightly raised small roundish leaf-scars with 3 bundle-traces; no stipule-scars; small hairy sometimes superposed buds; rather large long-stalked palmately nerved ovate or sometimes elongated often cordate or hastate leaves, small imperfect polypetalous flowers in axillary racemes

or panicles; and berry-like drupe with ring-like transversely ridged stone.

Leaves glabrescent above: fruit red. Tender. C. carolinus.
Leaves pubescent: fruit blue-black. Hardy. C. trilobus.

MENISPERMUM. Moonseed.

Half-woody twining plants with somewhat fluted green stems; rather large homogeneous pale pith; alternate round leaf-scars with a raised border and numerous bundle-traces in a single series; no stipule-scars; rounded often superposed buds; rather large long-stalked palmately veined angled or very shallowly lobed leaves; small dioecious polypetalous flowers in long-stalked axillary clusters; and berry-like drupe with ring-like dorsally keeled stone.

Leaves obtusely angled or shallow-lobed. M. canadense.

Family MAGNOLIACEAE. Magnolia Family.

A rather small family, usually shrubby but including some trees of large size such as the tulip tree which furnishes "poplar" lumber, etc.: much used in landscape work.

LIRIODENDRON. Tulip Tree.

Large rather percurrent deciduous trees with intricately fissured bark; pale soft wood with very minute diffused ducts and extremely fine medullary rays; moderate terete twigs; roundish light brown pith with firmer diaphragms; alternate somewhat raised nearly round leaf-scars with about a dozen scattered bundle-traces; very narrow stipule-scars encircling the twigs; solitary sometimes stalked flattened or 2-edged buds with 2 valvate scales; rather large simple truncate or deeply notched stalked leaves with 2 or more lateral lobes; large green and yellow perfect polypetalous terminal flowers; and a cone-like fruit, the indehiscent 1-seeded winged carpels falling away from a persistent spike-like axis.

1. Leaves not lobed at base. L. Tulipifera integrifolium.
   Leaves with 2 or 4 basal lobes. 2.
2. Lobes 2, obtuse. L. Tulipifera obtusilobum.
   Lobes often 4, acute. 3.

3. Tree narrowly pyramidal. T. Tulipifera pyramidale.
   Tree broad-topped. 4.
4. Leaves unvariegated. L. Tulipifera.
   Leaves yellow-margined. L. Tulipifera aureo-maginatum.

MAGNOLIA.

Deciduous or evergreen shrubs or usually trees with pale or yellow rather soft wood with minute diffused ducts and fine medullary rays; often stout terete twigs; pale continuous rounded pith; alternate low half-elliptical or U-shaped leaf-scars with some 10 or more bundle-traces in a single series or scattered; linear stipule-scars encircling the stem; sessile ovoid or fusiform rather large buds with a single exposed scale bearing a petiole-scar above its base; elliptical to obovate entire petioled leaves; large showy solitary open polypetalous flowers; and small leathery aggregated capsules from which the red-arillate solitary seeds finally hang on threads.

1. Evergreen: pith with firmer plates. 2.
   Deciduous: pith homogeneous. 3.
2. Leaves heavy, green or rusty beneath. M. grandiflora.
   Leaves thin, glaucous beneath. (Sweet bay). M. glauca.
3. Twigs swollen: leaves clustered at end. 4.
   Twigs not swollen: leaves spaced: buds silky. 6.
4. Twigs and buds hairy. M. macrophylla.
   Twigs and buds glabrous. 5.
5. Leaves not auricled. M. tripetala.
   Leaves auricled at base. M. Fraseri.
6. Rather large trees, flowering when in leaf. 7.
   Smaller, flowering before the leaves appear. 8.
7. Flowers yellowish green. (Cucumber tree). M. acuminata.
   Flowers orange-yellow. M. acuminata cordata.
8. Petals numerous. 9.
   Petals six to nine. 10.
9. Flowers white. M. stellata.
   Flowers rosy. M. stellata rosea.
10. Flowers white or lemon-shaded. 11.
    Flowers carmine or purplish shaded. 12.

11. Sepals very narrow.	M. Kobus.
Sepals resembling the petals.	M. denudata.
12. Flowers white with light tinging.	× M. Soulangeana.
Flowers deep-shaded without. 13.	
13. Flowers cup-shaped, early.	M. obovata.
Flowers pear-shaped, often continuing.	× M. Lennei.

Family CALYCANTHACEAE. Carolina Allspice Family.

A small family of shrubs, of no great use but attractive because of their fragrant flowers.

CALYCANTHUS. Strawberry Shrub.

Deciduous shrubs with moderate aromatic often 4-lined twigs widened at the nodes: round or 6-sided homogeneous pale pith; opposite elevated crescent-shaped leaf-scars with 3 bundle-traces; no stipule-scars; ovoid sessile sometimes superposed buds, the terminal usually absent, with about 4 opposite scales; simple entire short-stalked moderate leaves; moderate lurid axillary flowers often strawberry-scented, with many distinct petals; and pear-shaped dry hypanthium enclosing large seedlike akenes. *(Butneria).*

1. Leaves very hairy beneath.	C. floridus.
Leaves nearly or quite glabrous. 2.	
2. Leaves green beneath.	C. fertilis.
Leaves whitened beneath.	C. fertilis glaucus.

Family ANNONACEAE. Custard Apple Family.

A rather small family of shrubs or small trees, chiefly of the tropics, yielding such fruits as sour sop, cherimoya, etc. The name papaw properly belongs to the "papaya" of the tropics (*Carica*).

ASIMINA. "Papaw."

Deciduous shrubs or very small trees with rather smooth dark gray bark; greenish soft wood with a zone of moderate ducts in the spring growth and decreasingly smaller ones diffused through the remainder, and distinct medullary rays; rather slender terete twigs; rounded continuous pale pith with firmer diaphragms; alternate half-round or broadly crescent-shaped leaf-scars with

about 5 bundle-traces in a single series; no stipule-scars; more or less stalked brown-silky buds, the terminal naked and elongated, the lateral often superposed with the upper globose and early losing its few outer scales and becoming brown-silky; simple large short-stalked leaves; perfect lurid large mostly solitary polypetalous flowers; and large oblong fleshy fruit with several large brown seeds.

Leaves oblanceolate or obovate, acuminate. A. triloba.

Family LAURACEAE. Laurel Family.

A family of moderate size, chiefly tropical, including the classic laurel or bay tree, and furnishing cinnamon, camphor, the alligator pear, etc.: little used in out-of-door planting.

BENZOIN. Spice Bush.

Deciduous aromatic shrubs with pale wood with minute diffused ducts and fine medullary rays; slender terete twigs with rounded homogeneous pith; alternate rather appressed superposed ovoid buds with about 3 exposed scales,—the uppermost one or two early developing into small clusters of rounded flower-buds; rather elliptical moderate entire leaves; low crescent-shaped leaf scars with 3 bundle-traces; small yellow polygamous apetalous flowers in nearly sessile lateral clusters; and red spicy drupes.

Glabrate. B. aestivale.

Pubescent. B. melissaefolium.

SASSAFRAS.

Deciduous finally large aromatic trees with rather soft brown ring-porous wood with the small autumnal ducts in more or less evident tangential series; rather slender green rounded twigs; continuous roundish pith; alternate low crescent-shaped small leaf-scars with 3 bundle-traces; no stipule scars; rounded few-scaled buds often developing the first season; petioled entire or varyingly lobed moderate mucilaginous leaves; small yellowish dioecious apetalous flowers clustered in the axils; and blue drupes in red cup-like bases.

Leaves and young twigs pubescent. S. variifolium.

Soon glabrate: twigs often glaucous. S. variifolium albidum.

Family CRASSULACEAE. Stonecrop Family.

A rather small family of succulent herbs, some in rockeries.

SEDUM. Stonecrop.

Perennial herbs with simple fleshy leaves alternate or crowded in whorls; no stipules; small usually perfect polypetalous flowers; and several small follicles from each flower.

1. Leaves scarcely broader than thick. 2.
   Leaves distinctly flattened. 3.
2. Leaves short, overlapping: flowers yellow. S. acre.
   Leaves elongated, spaced. S. pulchellum.
3. Leaves at least partly in whorls of three. 4.
   Leaves not whorled. 5.
4. Leaves entire, some in rosettes. S. ternatum.
   Leaves crenate, not in rosettes. S. Sieboldii.
5. Low: some leaves in rosettes: flowers white. S. Nevii.
   Erect: without rosettes: flowers purplish. S. purpureum.

Family SAXIFRAGACEAE. Saxifrage Family.

A moderate-sized family including many perennial herbs used in gardening; the source of gooseberries and garden "currants" (real currants being the small seedless Corinthian grapes often used in pastry); and comprising several of the most showy shrubs employed in landscape work.

PHILADELPHUS. "Syringa." Mock Orange.

Deciduous shrubs with often exfoliating brown bark; white firm wood with minute diffused ducts and fine medullary rays; moderate or slender more or less 6-sided twigs; rounded or 6-sided continuous pith; opposite (exceptionally in whorls of 3) raised membranous leaf-scars usually concealing the buds, with 3 prominent bundle-traces; ovoid sessile buds with few evident scales; lanceolate or ovate petioled mostly remotely denticulate or toothed simple leaves; rather large perfect polypetalous white or creamy stalked flowers, a few from each upper axil or sub-panicled; and few seeded small turbinate inferior capsules long surmounted by the calyx segments.

1. Leaves small (scarcely 4 cm. long). 2.
   Leaves mostly large (over 5 cm. long). 3.
2. Leaves pubescent. P. hirsutus.
   Leaves glabrate. P. brachybotrys.
3. Bark distinctly and early flaking away. 4.
   Bark tardily flaking: flowers scarcely fragrant. 11.
4. Flowers very fragrant. 5.
   Flowers not, or little, fragrant, white. 9.
5. Flowers creamy. (P. coronarius). 6.
   Flowers white. (× P. Lemoinei). 8.
6. Leaves green. 7.
   Leaves yellow. P. coronarius aureus.
   Leaves pale-margined. P. coronarius argenteo-marginatus.
7. Flowers single. P. coronarius.
   Flowers double. P. coronarius flore plena.
8. Flowers single. × P. Lemoinei.
   Flowers double P. Lemoinei flore plena.
9. Flowers 1-5 on a shoot. (P. inodorus). 10.
   Flowers 5-9 on a shoot. × P. Zeyheri.
10. Flowers and leaves rather small. P. inodorus.
    Flowers (50 mm.) and leaves large. P. inodorus grandiflorus.
11. Bark brown: calyx glabrous. P. Lewisii.
    Bark gray: calyx pubescent. (P. pubescens). 12.
12. Flowers single. P. pubescens.
    Flowers double. P. pubescens flore plena.

DEUTZIA.

Deciduous shrubs, sometimes small, with monopodial branches with roundish pale spongy or excavated pith; opposite or sometimes whorled moderately small buds with several exposed scales; low crescent-shaped leaf-scars with 3 bundle-traces; ovate or lanceolate serrate simple leaves; rather small but showy white or rosy-tinted perfect polypetalous flowers in small panicles; and several-celled small capsules with minute seeds.

1. Leaves glabrate beneath: sepals persistent. 2.
   Leaves stellate pubescent on both faces. 7.
2. Flowers in racemes, white. 3.
   Flowers panicled. 4.

3. Leaves green. D. gracilis.
   Leaves yellow. D. gracilis aurea.
   Leaves white-dotted. D. gracilis albo-marmorata.
4. Flowers white. D. rosea multiflora.
   Flowers more or less rosy. 5.
5. Flowers carmine on the outside. D. rosea carminea.
   Flowers pinkish. 6.
6. Colored within and without. D. rosea.
   White within. D. rosea eximia.
7. Leaves green. 8.
   Leaves white-blotched or dotted. 11.
8. Flowers white. 9.
   Flowers rosy without. 10.
9. Flowers single. D. scabra.
   Flowers double. D. scabra candidissima.
10. Flowers single. D. scabra Watereri.
    Flowers double D. scabra plena.
11. Leaves blotched. D. scabra marmorata.
    Leaves white dotted. D. scabra punctata.

DECUMARIA.

Deciduous woody plants climbing by aerial roots, with moderately slender more or less angled or compressed twigs; angular spongy pith; opposite somewhat raised U-shaped leaf scars at first half-round by a deciduous membrane, with 3 bundle-traces; no stipule scars; conical hairy superposed buds with indistinct scales; moderately large ovate petioled leaves; small perfect polypetalous white flowers in terminal corymbs; and small top-shaped ribbed capsules.

Leaves glabrous, sometimes serrate above. D. barbara.

SCHIZOPHRAGMA.

Deciduous shrubs climbing by aerial roots, with moderately slender terete twigs; round continuous pith; opposite low broadly crescent-shaped leaf-scars with 3 bundle-traces; no stipule-scars; rather large petioled leaves; small white perfect polypetalous flowers in broad terminal clusters surrounded by neutral

flowers with a single large sepal; and small inferior many-seeded capsules.

Leaves round-ovate, toothed. S. hydrangeoides.

HYDRANGEA.

Deciduous shrubs usually sparingly or coarsely branched, exceptionally climbing by aerial roots, often with shredding bark, with nearly terete twigs; relatively large round homogeneous pale pith; low crescent-shaped to half-round or triangular leaf-scars, opposite or in whorls of three, with 3 or in some cases 5 or 7 bundle-traces in a single series; no stipule-scars; oblong solitary subsessile buds usually with several pairs of scales; rather large simple toothed or lobed stalked leaves; small perfect polypetalous flowers in compound terminal clusters, often surrounded by showy sterile ones; and small inferior capsules.

1. Climbing by roots. H. petiolaris.
   Not climbing. 2.
2. Leaves lobed. H. quercifolia.
   Leaves not lobed. 3.
3. Flower-clusters pyramidal. 4.
   Flower-clusters broad. 6.
4. With many fertile small flowers. 5.
   Most flowers large and sterile. H. paniculata grandiflora.
5. Flowering in late summer. H. paniculata.
   Flowering in early summer. H. paniculata praecox.
6. Leaves glabrous beneath. H. arborescens.
   Leaves pale-pubescent beneath. 7.
7. Leaves thin, grayish beneath. H. cinerea.
   Leaves firm, white beneath. H. radiata.

FENDLERA.

Deciduous shrubs with slender often short fluted twigs; somewhat angled pale homogeneous pith; opposite raised crenately U-shaped leaf-scars, connected by transverse lines, with 3 bundle traces; no stipule-scars; sessile ovoid buds with several indistinct scales; small sessile entire leaves; moderately small

perfect polypetalous white flowers terminating the branchlets; and half-inferior pointed ovoid many-seeded capsules dehiscing part-way from the top.

Leaves ovate to oblong, rough, often 3-nerved. F. rupicola.

JAMESIA.

Deciduous shrubs with flaking bark; rather slender roundish twigs; rather large rounded continuous brownish pith; opposite low narrow U-shaped leaf-scars with 3 bundle traces; no stipule-scars; simple rather small leaves with their dilated petioles meeting around the stem; perfect polypetalous moderately small white flowers in small terminal clusters; and ovoid beaked small-seeded inferior capsules.

Leaves ovate, serrate, woolly beneath. J. americana.

RIBES. Currant. Gooseberry.

Deciduous often prickly shrubs with soft brownish wood with minute ducts in more or less evident tangential rows and rather heavy medullary rays; terete or somewhat angled moderate twigs; roundish continuous colored pith; alternate transverse or openly U-shaped somewhat raised leaf-scars with 3 bundle-traces; no stipule-scars; ovate or round somewhat lobed and toothed moderate or small leaves; small perfect polypetalous flowers, with cup- or salver-shaped calyx, clustered or racemed from the axils; and small inferior several-seeded berries.

1. Leaves with prominent sessile resin-glands. R. americanum.
   Leaves without resin-glands. 2.
2. Leaves truncate or cuneate at base: calyx-tube long and slender. (Golden Currants). 3.
   Leaves not cuneate: calyx-tube shorter. 4.
3. Calyx-tube twice as long as sepals. R. odoratum.
   Calyx tube little longer than sepals. R. aureum.
4. Prickly at least at the nodes: leaves pubescent. 5.
   Stems not prickly: leaves glabrescent. 7.
5. Petioles pubescent and also with gland-tipped hairs: fruit usually prickly. R. Cynosbati.
   Petioles gray-pubescent, scarcely glandular. 5.

6. Fruit bristly. R. Grossularia.
   Fruit neither bristly nor prickly. R. oxyacanthoides.
7. Petiole shorter than blade: buds glabrous. R. alpinum.
   Petiole longer than blade: buds pubescent. R. vulgare.

Family HAMAMELIDACEAE. Witch Hazel Family.

A small family including such trees as *Liquidambar*, which yields the valuable sweet-gum lumber; chiefly shrubs.

CORYLOPSIS.

Deciduous shrubs with slender or moderate rounded zig-zag twigs; roundish homogeneous pale pith; alternate 2-ranked somewhat raised crescent-shaped leaf-scars with 3 separated or transversely aggregated bundle-traces; elongated stipule-scars; large scaly buds; rather large ovate stalked bristly-toothed, subpalmately nerved leaves; racemed perfect polypetalous yellow flowers appearing before the leaves; and partly inferior dry fruit.

Flowers 2 or 3 in a raceme. C. pauciflora.
Flowers about 8 in a raceme. C. spicata.

HAMAMELIS. Witch Hazel.

Deciduous shrubs with rather slender rounded somewhat zig-zag twigs; somewhat angular homogeneous pale pith; alternate 2-ranked somewhat raised crescent-shaped or half-round leaf-scars with 1 aggregate bundle-trace; triangular stipule-scars; frequently superposed buds, naked or the lateral stalked or quickly developing into small clusters of globose flower-buds; rather large roundish stalked crenate subpalmately nerved leaves; small lateral clusters of perfect flowers with long fringe-like distinct yellow petals; and ovoid small hard fruits, 2-lobed with notched valves, above the adherent calyx-rim.

1. Leaves tomentose beneath. H. mollis.
   Leaves not tomentose, 2.
2. Flowering in autumn, with ripe fruits. H. virginiana.
   Flowering in winter or spring. 3.
3. Calyx attached to the lower half of fruit. H. vernalis.
   Calyx attached to the lower third of fruit. H. japonica.

FOTHERGILLA. Dwarf Alder.

Deciduous shrubs with rather slender rounded somewhat zig-zag twigs; somewhat angular homogeneous pale pith, alternate 2-ranked little-raised half-round leaf-scars with 1 bundle-trace; triangular stipule-scars; ovoid sessile buds with a pair of stipular scales; rather large roundish stalked leaves subpalmately nerved, and toothed above the middle; small perfect pale flowers in terminal spikes; and globose small hard fruits, 4-lobed above the adherent calyx-rim.

1. Leaves somewhat glaucous beneath, glabrate. F. major.
   Leaves merely paler green beneath. 2.
2. Leaves large (50 mm.), glabrate. F. monticola.
   Leaves rather small (scarcely 25 mm.). 3.
3. Leaves sparingly stellate-hairy above, obovate. F. Gardeni.
   Leaves downy above, ovate-cordate. F. parvifolia.

LIQUIDAMBAR. Sweet Gum.

Deciduous rather large resinous trees with rather hard light brown wood with very numerous minute diffused ducts and crowded fine medullary rays; rather stout rounded often corky-ridged twigs; angled homogeneous pale pith; alternate half-round low leaf-scars with 3 bundle-traces; obscure stipule-scars; ovoid solitary glossy buds with half-a-dozen exposed scales, frequently becoming stalked or developing the first season; rather large simple palmately nerved and lobed long-stalked leaves frequently clustered on spurs; inconspicuous monoecious apetalous flowers, the staminate in racemed head-like clusters, and the pistillate in a long-stalked head becoming a bur-like aggregate of inferior dry beaked capsules.

Leaves with hairy tufts beneath. L. Styraciflua.
Leaves without hairy tufts. L. orientalis.

Family PLATANACEAE. Sycamore Family.

A small family comprising a single genus of rather few species, the common button-ball furnishing the characteristic wood used for very cheap cigar-boxes: much planted as street trees,—the oriental plane frequently pollarded into an umbrella form in Europe.

PLATANUS. Sycamore. Buttonball.

Deciduous trees with exfoliating bark while young; light brown rather firm wood with minute diffused ducts and close and rather thick medullary rays; moderate usually elongated roundish twigs; roundish continuous browning pith; somewhat raised 2-ranked nearly annular crenulate leaf-scars encircling the ovoid sessile 1-scaled buds and with about 7 bundle traces; narrow stipule-scars encircling the node; no terminal bud; broadly ovate mostly palmately 3- or 5-lobed and coarsely and acutely toothed petioled leaves; and small monoecious flowers and very small dry plumed fruits in large globose long-stalked aggregates.

1. Fruit aggregates solitary: stipules large toothed. 2.
   Fruit aggregates usually 2. P. acerifolia.
   Fruit aggregates usually 3 or 4: stipules subentire. 5.
2. Tree ovoid. 3.
   Tree oblong. P. occidentalis pyramidalis.
3. Leaves green. P. occidentalis.
   Leaves variegated. 4.
4. Leaves white-blotched. P. occidentalis Suttneri.
   Leaves yellow-blotched. P. occidentalis aureo-variegata.
5. Leaves moderately lobed. P. orientalis.
   Leaves deeply lobed. P. orientalis digitata.

Family ROSACEAE. Rose Family.

A large and very heterogeneous family yielding the most important fruits of temperate regions, *e.g.* strawberries, raspberries, blackberries, apples, pears, peaches, plums, apricots, cherries: including many shrubs indispensable in landscape work.

PHYSOCARPUS. Ninebark.

Deciduous shrubs with exfoliating bark; moderately slender twigs decurrently angled or grooved below the nodes; roundish continuous pith; alternate raised often 3-lobed leaf-scars with 3 bundle-traces; decurrent stipule-scars; ovoid sessile rather spreading buds with about 5 exposed scales; ovate more or less 3-lobed irregularly crenately toothed petioled leaves;

rather small perfect slender-stalked polypetalous white flowers in compact round clusters at end of the branches; and dry inflated follicles, mostly 3 to a flower. *(Opulaster).*

1. High-growing. 2.
   Dwarf, resembling Ribes. P. opulifolius nanus.
2. Fruit glabrous. 3.
   Fruit pubescent. 4.
3. Leaves green. P. opulifolius.
   Leaves yellow. P. opulifolius luteus.
4. Fruits much longer than the sepals. P. intermedius.
   Fruits little longer than the sepals. P. amurensis.

STEPHANANDRA.

Deciduous low shrubs with slender terete twigs; round continuous pith; alternate small low crescent-shaped leaf-scars with a single compound bundle trace; transverse stipule-scars; sessile ovoid often superposed buds with several exposed scales; ovate petioled lobed or toothed leaves; small perfect polypetalous white flowers in terminal panicles; and small 1- or 2-seeded capsules, dehiscent below.

Leaves rather small (about 3 cm.), deeply lobed. S. incisa.
Leaves larger (often 7 cm.), less deeply lobed. S. Tanakae.

SPIRAEA.

Deciduous shrubs of small size or with slender wand-like usually somewhat 5-angled branches, with roundish pale continuous pith; 5-ranked often pointed divergent buds with several scales; small crescent-shaped somewhat raised leaf-scars with a single bundle-trace; mostly lanceolate serrate occasionally linear and entire or broad and sometimes lobed small leaves often pale beneath; small white or rosy perfect polypetalous flowers in axillary clusters or forming elongated panicles or compound corymbs; and a number of small usually glabrous follicles in each persistent calyx.

1. Leaves linear, (scarcely 5 mm. wide). S. Thunbergii.
   Leaves lanceolate or oblanceolate. 2.
   Leaves ovate or rounded. 8.

2. Leaves small (scarcely 10 × 30 mm.), nerved. × S. arguta.
   Leaves distinctly larger, veiny. 3.
3. Leaves rhombic-lanceolate. × S. cantoniensis.
   Leaves not rhombic. 4.
4. Flowers in flat corymbs, often pink. × S. Bumalda.
   Flowers in elongated panicles. 5.
5. Tomentose: flowers pink. 6.
   Stems and foliage glabrous: flowers white. 7.
6. Fruit glabrous. S. Douglasii.
   Fruit pubescent. S. tomentosa.
7. Twigs yellow-brown: inflorescence woolly. S. salicifolia.
   Twigs reddish-brown: inflorescence glabrate. S. latifolia.
8. Pubescent: leaves ovate, minutely serrulate. 9.
   Glabrous. 10.
9. Flowers single. (Bridal Wreath). S. prunifolia.
   Flowers double. S. prunifolia plena.
10. Leaves serrate. × S. multiflora.
    Leaves often lobed. 11.
11. Leaves very obtuse. S. trilobata.
    Leaves often rather acute. × S. Vanhouttei.

NEVIUSIA. Snow Wreath.

Deciduous small shrubs with slender twigs 3-lined below the nodes; round homogeneous pith; alternate raised small half-round leaf-scars with a single bundle-trace; no stipule-scars; sessile ovoid buds with about 8 exposed scales; rather small petioled leaves; slender-stalked dioecious apetalous flowers with elongated white stamens, at ends of the branches; and several somewhat fleshy pubescent akenes to each persistent calyx.

Leaves ovate, double serrate. N. alabamensis.

SORBARIA.

Deciduous small shrubs with slender terete twigs; relatively large continuous roundish brownish pith; alternate little raised broadly triangular leaf-scars with 3 bundle-traces; no stipule scars; ovoid buds somewhat contracted at base, with several scales; odd pinnate leaves with serrate leaflets; perfect moder-

ately small polypetalous white flowers in ample panicles; and small oblong capsules dehiscent at top.

Leaves with rather large leaflets. S. sorbifolia.

CHAMAEBATIARIA.

Deciduous small glandular-pubescent shrubs resembling *Sorbaria* but with decompound fern-like foliage.

Leaves bipinnate, with minute leaflets. C. Millefolium.

PYRUS. Pear. Apple.

Deciduous trees or shrubs with hard mostly reddish-brown wood with minute scattered ducts and fine medullary rays; moderately slender terete twigs sometimes dwarfed or pungent; roundish continuous pale pith; alternate somewhat raised narrowly crescent-shaped leaf-scars with 3 bundle-traces; scarcely evident if any stipule-scars; ovoid sessile buds with several often gland-tipped scales; ovate to lanceolate entire or serrate or lobed petioled leaves; rather large white or pink perfect polypetalous epigynous flowers clustered on the spurs; and few-seeded apple- or pear-like fruit with papery core. The apples are often segregated under the genus *Malus*.

1. Leaves nearly glabrate. 2.
   Leaves markedly hairy or woolly beneath. 5.
2. Leaves entire or finely serrate, ovate, (Pear). P. communis.
   Leaves toothed or rarely lobed. 3.
3. Leaves long-pointed. P. serotina culta.
   Leaves at most acute. 4.
4. Leaves ovate or oblong to lanceolate. P. angustifolia.
   Leaves broadly ovate. P. spectabilis.
5. Leaves toothed but scarcely lobed. 6.
   Leaves often distinctly lobed. 12.
6. Usually seen as shrubs. 7
   Trees. 8.
7. Calyx absent from the ripe fruit. P. pulcherrima.
   Calyx persistent on the fruit. P. prunifolia Rinki.
8. Fruit very small (scarcely 20 mm.). 9.
   Fruit distinctly larger. 10.

9. Calyx often persistent on the fruit. P. micromalus.
   Calyx absent from fruit. (Siberian crab). P. baccata.
10. Calyx absent. (Orchard crab). P. baccata×Malus.
    Calyx persistent on the fruit. 11.
11. Leaves not at all lobed. (Apple). P. Malus.
    Leaves slightly crenately lobed. × P. Soulardi.
12. Calyx persistent on the fruit. (American crab apples). 13.
    Calyx absent from the fruit. Asiatic. P. Sieboldii.
13. Leaves rather hastately few-lobed. P. coronaria.
    Leaves not hastate. 14
14. Flowers single. P. ioensis.
    Flowers double. (Bechtel crab). P. ioensis plena.

ARONIA. Chokeberry.

Deciduous shrubs with rather slender subterete branches with roundish homogeneous pith; alternate appressed solitary ovoid or oblong buds with about 3 exposed scales; rather lanceolate moderate serrate leaves with slender black glands on the midrib above; small low crescent-shaped leaf-scars with 3 bundle-traces; rather small cymose perfect polypetalous epigynous flowers; and small red or black berry-like pomes.

1. Leaves glabrate: fruit black. A. melanocarpa.
   Leaves pubescent beneath. 2.
2. Fruit black-purple. A. atropurpurea.
   Fruit red. A. arbutifolia.

SORBUS. Mountain Ash. Rowan Tree.

Deciduous small trees with rather soft pale or brown wood with minute diffused ducts and fine medullary rays; moderate or rather stout terete twigs; somewhat angled rather large pith; alternate narrowly crescent-shaped or transverse somewhat raised leaf-scars with about 5 bundle-traces; no stipule-scars; large appressed sessile buds with several scales; alternate odd-pinnate or simple petioled leaves with serrate blade or leaflets; perfect small polypetalous epigynous white flowers in compound terminal corymbs; and small red or orange berry-like pomes.

1. Leaves compound. 2.
   Leaves simple. S. Aria.

2. Leaves pinnate throughout. 3.
   Upper part of leaves not pinnate. × S. hybrida.
3. Buds silky, not glutinous. S. Aucuparia.
   Buds very glutinous. S. americana.

CHAENOMELES. Japanese Quince.

Deciduous firm-leaved shrubs, with typically axillary spines; with roundish rather slender twigs; irregular rounded homogeneous pale pith; alternate raised crescent-shaped small leaf-scars with 3 sometimes compound bundle-traces; small stipule-scars; ovoid small solitary sessile buds with about 2 exposed scales; crenulate to serrate moderate-sized short-stalked leaves; rather large solitary deep red to pure white perfect epigynous polypetalous flowers; and large fragrant many-seeded orange pomes. —Often placed under *Cydonia*.

1. Stipules large and leaf-like. 2.
   Stipules small. C. sinensis.
2. Leaves pubescent when young. C. cathayensis.
   Leaves glabrous. 3.
3. Twigs glabrate: leaves sharply serrate. C. japonica.
   Twigs hairy when young: leaves crenate. C. Maulei.

CYDONIA. Quince.

Deciduous shrubs or very small trees with light brown firm wood with minute diffused ducts and fine medullary rays; rounded twigs; small roundish homogeneous pale pith; alternate raised crescent-shaped 3-lobed small leaf-scars with 3 bundle-traces; no stipule scars; simple entire stalked moderately large leaves; rather large perfect epigynous polypetalous whitish flowers solitary at ends of the branches; and large firm aromatic pomes.

1. Leaves not variegated. 2.
   Leaves mottled. C. oblonga marmorata.
2. Round- topped. (Common quince). C. oblonga.
   Conical. C. oblonga pyramidalis.

PHOTINIA.

Deciduous shrubs with hard wood with minute diffused ducts and fine medullary rays; rather slender roundish twigs;

crenate continuous pith; alternate somewhat raised transverse or crescent-shaped leaf-scars with 3 bundle-traces; no stipule-scars; sessile ovoid pointed buds with several exposed scales; rather small finely serrate short-petioled lance-oblong leaves; small perfect polypetalous epigynous white flowers in corymb-like clusters terminating the spurs; and 1- to 2-seeded somewhat elongated small red pomes bearing the sepals somewhat below the top, the fruit-stalks with very large lenticels.

Leaves pubescent beneath. P. villosa.
Leaves glabrescent. P. villosa laevis.

COTONEASTER.

Mostly deciduous shrubs with hard light brown wood with minute diffused ducts and fine medullary rays; slender rounded twigs; angular homogeneous small pale pith; alternate somewhat raised small transverse leaf-scars with 1 or 3 bundle-traces; narrow stipule-scars or persistent stipules; solitary oblong sessile buds with about 4 exposed scales; simple entire stalked leaves; small perfect epigynous flowers in terminal corymbs; and small berry-like pomes with incurved sepals.

1. Evergreen: leaves very small, glossy. C. microphylla.
   Deciduous or not fully evergreen. 2.
2. Leaves white- or gray-woolly beneath. 3.
   Leaves glabrate. 5.
3. Sepals glabrous on the outside. 4.
   Sepals gray-fleecy. C. tomentosa.
4. Leaves orbicular. C. racemiflora.
   Leaves elliptical- or round-ovate. C. integerrima.
5. Fruit black. C. acutifolia.
   Fruit red. C. acuminata.

AMELANCHIER. Shadbush.

Shrubs or trees, usually rather small, with smooth bark; reddish brown hard wood with minute ducts, more crowded in spring, and fine medullary rays; slender nearly terete twigs; somewhat 5-sided pale continuous pith; alternate sometimes 2-ranked low crescent-shaped leaf-scars with 3 bundle-traces; no stipule-scars; appressed elongated acute buds with about 5 ex-

posed scales: moderate serrate petioled leaves; moderate perfect polypetalous epigynous white flowers; and small berry-like purple pomes.

1. Leaves always glabrous, closely serrate. A. laevis.
   Leaves for a time woolly beneath. 2.
2. Leaves closely serrate (teeth 10 to 1 cm.). A. canadensis.
   Leaves more distantly toothed (teeth 5 to 1 cm.). 3.
3. Leaves rather acute, persistently tomentose. A. sanguinea.
   Leaves very obtuse, quickly glabrous. A. alnifolia.

CRATAEGUS. Haw. Red Haw.

Deciduous shrubs or small trees, usually with axillary spines; hard usually brownish wood with very minute diffused ducts and fine medullary rays; rounded twigs; somewhat angular homogeneous pale pith; alternate not raised crescent-shaped small leaf-scars with 3 bundle-traces; round-ovoid solitary sessile buds with several fleshy often red scales; simple usually toothed or lobed stalked leaves frequently clustered on spurs; moderate perfect epigynous white or rosy flowers usually in terminal corymbs; and small apple-like fruits with bony core.—A hopelessly complex genus, the following common.

1. Leaves spatulate or cuneate-obovate, rarely large or lobed. 2.
   Leaves elliptical or obovate. 4.
   Leaves round or ovate. 6.
2. Leaves glabrous, glossy above, spines long. C. Crus-galli.
   Leaves pubescent beneath. 3.
3. Leaves dull, with strong veins. C. punctata.
   Leaves glossy above, fruit often downy. C. tomentosa.
4. Spines curved: nutlets with concave sides. C. macracantha.
   Spines straight: nutlets with flat sides. 5.
5. Spines long: leaves rather thin and dull. C. tomentosa.
   Spines short: leaves rather firm or glossy. C. viridis.
6. Leaves deeply lobed. 7.
   Leaves at most shallow-lobed. 9.
7. Veins running from midrib both to sinuses and lobes. 8.
   Veins running from midrib to lobes only. C. Phaenopyrum.

8. Style one. 9.
   Styles two or three. 19.
9. Spiny. 10.
   Unarmed. C. monogyna inermis.
10. Leaves moderately lobed. 11.
    Leaves incised. C. monogyna laciniata.
11. Shrubby, ever-blooming. C. monogyna semperflorens.
    Tree-like. 12.
12. Somewhat fastigiate. C. monogyna stricta.
    Not fastigiate. 13.
13. Flowers white. 14.
    Flowers rosy or red. 15.
14. Flowers single. C. monogyna.
    Flowers double. C. monogyna albo-plena.
15. Somewhat weeping. C. monogyna roseo-pendula.
    Not weeping. 16.
16. Flowers single. 17.
    Flowers double. C. monogyna rubro-plena.
17. Flowers white at center. C. monogyna rosea.
    Flowers colored throughout. C. monogyna punicea.
18. Flowers white. 19.
    Flowers rosy or red. 20.
19. Fruit bright red. C. Oxyacantha.
    Fruit yellow. C. Oxyacantha aurea.
20. Flowers single, white at center. C. Oxyacantha bicolor.
    Flowers double, red throughout. C. Oxyacantha Paulii.
21. Leaves scarcely longer than broad. C. rotundifolia.
    Leaves distinctly longer than broad. 22.
22. Leaves large, softly hairy beneath. 23.
    Leaves glabrate. C. pruinosa.
23. Armed. C. mollis.
    Spineless. C. mollis inermis.

PYRACANTHA. Firethorn.

Evergreen shrubs with hard brownish wood with numerous minute diffused ducts and fine medullary rays; slender somewhat fluted twigs often forming spurs or transformed into

spines; small continuous pith; alternate slightly-raised crescent-shaped leaf-scars with 3 bundle-traces; scarcely evident stipule-scars; sessile ovoid pointed appressed buds with several exposed scales; rather small lanceolate slender-petioled leaves; small perfect corymbed polypetalous epigynous white flowers; and small typically red pomes with 2-seeded bony core-cavities. —Often placed in *Crataegus*.

Leaves acute at both ends, low-crenate. P. coccinea.

RHODOTYPOS.

Deciduous shrubs with slender terete twigs; relatively large round continuous white pith; opposite somewhat raised triangular or 3-lobed leaf-scars with 3 bundle-traces; no stipule-scars; ovoid sessile buds with some 3 pairs of exposed scales; large thin wrinkled petioled leaves; few relatively large perfect polypetalous perigynous white flowers ending the branches; and fruit of about 5 black drupes in each enlarged calyx. The buds are often collaterally multiplied.

Leaves ovate, acuminate, doubly serrate. R. kerrioides.

KERRIA. "Corchorus."

Rather small deciduous shrubs with slender angled green twigs; rounded homogeneous pale pith; alternate 2-ranked somewhat raised triangular or transverse leaf-scars with 3 bundle-traces; no stipule-scars; solitary sessile ovoid appressed buds with four or five rather loose ciliate scales; simple, doubly toothed moderately large short-stalked leaves; perfect rather large perigynous yellow flowers ending the branches; and several small akenes in each persistent calyx.

1. Unvariegated. 2.
   Variegated. 3.
2. Flowers single. K. japonica.
   Flowers double. K. japonica flore-pleno.
3. Twigs striped with yellow. K. japonica vittato-ramosa.
   Twigs green. 4.
4. Leaves striped with yellow. K. japonica aureo-vittata.
   Leaves edged with white. K. japonica argenteo-variegata.

EXOCHORDA. Pearl Bush.

Deciduous shrubs with brownish wood with minute diffused ducts, somewhat more crowded in spring, and fine medullary rays; moderately slender terete twigs; round homogeneous pale pith; alternate slightly raised crescent-shaped leaf-scars with 3 bundle-traces; no stipule scars; oblong ovoid sessile solitary erect buds, with about 8 exposed scales; moderate simple entire or few-toothed rather short-stalked leaves; rather large perfect polypetalous perigynous green-centered white flowers clustered at ends of the branches; and small star-shaped bony fruits.

Leaves nearly elliptical, whitened beneath. E. racemosa.

SIBBALDIA.

Small matted perennials, woody only at base, with palmate trifoliolate long-petioled basal leaves; small perfect polypetalous yellow flowers in stalked corymbose clusters; and several akenes in each persistent calyx.

Leaflets cuneate, crenately toothed at end. S. procumbens.

POTENTILLA. Cinquefoil.

Usually perennial herbs; a few deciduous shrubs with brownish wood with minute diffused ducts, somewhat more sparse in summer, and fine medullary rays; somewhat angular brown continuous pith; alternate minute round raised leaf-scars with a single bundle-trace, flanked by persistent stipules; small ovoid buds; compound leaves with several rather small leaflets; perfect open usually yellow polyetalous perigynous flowers with bractlets on the calyx; and numerous small akenes.

Leaves pinnate: leaflets linear, entire. P. fruticosa.

Leaflets palmate, 3, notched at end. P. tridentata.

DRYAS.

Small matted trailing woody evergreens with rather small alternate slender-stalked simple leaves, white-woolly beneath; rather large perfect open polypetalous perigynous flowers solitary at ends of long erect stalks; and large clusters of long feathery-tailed akenes.

1. Leaves entire. D. integrifolia.
   Leaves crenately serrate. 2.
2. Flowers white: sepals narrow. D. octopetala.
   Flowers yellow; sepals ovate. D. Drummondii.

RUBUS. Bramble.

Tardily deciduous mostly prickly shrubs with moderately slender more or less angular twigs; continuous pith of corresponding shape; alternate raised torn petiole-bases rather than distinct leaf-scars; no stipule-scars; ovoid sometimes superposed buds with several exposed scales; simple or mostly compound often toothed petioled leaves; conspicuous perfect usually clustered polypetalous perigynous flowers; and small drupe-like fruits in a cluster which breaks away from each persistent calyx with the end of the receptacle (blackberries), or separates from this, thimble-like (raspberries).

1. Leaves simple: bark shredding: branches bristly, without prickles. (Flowering raspberries). 2.
   Leaves compound: bark not shredding. 4.
2. Flowers white. 3.
   Flowers magenta. R. odoratus.
3. Flowers usually solitary. R. deliciosus.
   Flowers usually several in a cluster. R. parviflorus.
4. Leaflets 5-15, distinctly pinnate. (Flowering brambles). 5.
   Leaflets 3-5, nearly or quite palmate. 6.
5. Flowers single. R. rosaefolius.
   Flowers double. R. rosaefolius coronarius.
6. Leaves white beneath: fruit thimble-like. (Raspberries). 7.
   Leaves not white: fruit solid. 11.
7. Stems with glandular hairs. R. phoenicolasius.
   Stems not red-hairy. 8.
8. Stems with bristles and also somewhat prickly. 9.
   Stems prickly but scarcely bristly. 10.
9. Fruit red. R. strigosus.
   Fruit amber. R. strigosus albus.

10. Fruit black. R. occidentalis.
    Fruit amber. R. occidentalis pallidus.
11. Erect or ascending. (Blackberries). 12.
    With many trailing stems. (Dewberries). 16.
12. Leaflets not laciniate. 13.
    Leaflets deeply cut. R. laciniatus.
13. Leaflets narrow, glabrous: prickles few. R. amabilis.
    Leaflets broad, somewhat hairy: prickles many. 14.
14. Flowers in elongated clusters: pedicels with many dark glandular hairs, and rather short-villous. 15.
    Flowers fewer: pedicels long-villous, glandless or with pale glands. R. argutus.
15. Fruit black. R. allegheniensis.
    Fruit amber. R. allegheniensis albinus.
16. Flowers moderate (about 25 mm.). R. procumbens.
    Flowers large (30 mm.). R. procumbens roribaccus.

ROSA. Rose.

Mostly deciduous and prickly shrubs, sometimes trailing or scrambling to a considerable height, with rather soft wood with small diffused ducts, the first in the spring somewhat larger, and relatively coarse medullary rays; moderately stout usually large and green terete twigs; rounded continuous pith; alternate low openly U-shaped leaf-scars with 3 bundle-traces; no stipule-scars; ovoid sessile buds with several exposed scales; odd-pinnate leaves with dilated stipule-bearing petioles; large green usually rosy or white perfect polypetalous perigynous flowers, mostly clustered at ends of the branches; and fleshy ovoid fruiting receptacle (hypanthium) enclosing a number of large hairy akenes. Too large and complex a genus for satisfactory brief analysis: only a very few of the most striking types are noted.

1. Evergreen. 2.
   Deciduous. 3.
2. Glabrate, trailing. (Memorial rose). R. Wichuraiana.
   Hairy, scrambling, horrid. (Macartney rose) R. bracteata.
3. Climbing or forming fountain-like masses. 4.
   Bushy. 6.

4. Leaflets about 7: flowers small, in spring. 5.
   Leaflets 5: flowers in summer. (Prairie rose). R. setigera.
5. Flowers white, early. (Polyantha rose). R. multiflora.
   Flowers red, in dense clusters, later. (Ramblers). R. multiflora platyphylla.
6. Flowers as in the last, through the season. (Baby rambler). R. multiflora platyphylla.
   Flowers large or not in dense clusters. 7.
7. Foliage not strongly scented. 10.
   Foliage heavy-scented, with bristly glands: flowers double. 8.
   Foliage aromatic, not bristly: flowers single. (Sweetbriers). R. rubiginosa.
8. Prickles uniform: teeth of leaflets glandless. (Damask rose). R. damascena.
   Prickles very unequal: teeth glandularly toothed. 9.
9. Calyx "mossy". (Moss roses). R. centifolia muscosa.
   Flowers not "mossy". (Cabbage roses). R. centifolia.
10. Flowers double. (Tea roses). R. odorata.
    Flowers single. 11.
11. Flowers yellow, early. (Yellow rose). R. foetida.
    Flowers pink: stem and foliage pinkish. R. rubrifolia.

PRUNUS. Plum. Cherry. etc.

Deciduous or exceptionally evergreen trees or shrubs with hard usually reddish wood with scattered ducts, the first of the year sometimes slightly larger and forming a ring of a single series, and fine medullary rays; rather slender terete twigs sometimes transformed into or ending in spines; rounded continuous pale pith; alternate somewhat raised crescent-shaped or half round leaf-scars with 3 bundle-traces; minute often indistinct stipule-scars; triangular or ovoid sessile buds, the terminal wanting in some groups, with several often denticulate exposed scales; chiefly lanceolate serrate petioled leaves; moderately small white perfect polypetalous perigynous flowers in axillary tufts or racemes; and various-sized 1-seeded drupes.

1. With scar left by terminal bud. 2.
   With terminal bud present. 10.

2. Buds round-ovoid, scarcely longer than thick. 3.
   Buds ovoid-conical, distinctly elongated. (Plum). 9.
3. Leaves round-ovate, firm, glabrous: buds dark, with ciliate scales. (Apricot). P. Armeniaca.
   Leaves distinctly longer than broad. (Plum). 4.
4. Buds puberulent, dark red. P. domestica.
   Buds glabrous. 5.
5. Scales red-brown, ciliate: leaves small. P. angustifolia.
   Bud-scales brown, not ciliate. 6.
6. Buds obtuse: petiole with nectar-glands. P. hortulana.
   Buds acute: petiole without glands. 7.
7. Leaves green. 8.
   Leaves purple. P. cerasifera Pissadii.
8. Flowers single. P. cerasifera.
   Flowers double. P. cerasifera Plantieriensis.
9. Buds red-brown, short (3-4 mm.). P. americana.
   Buds blackish or gray, long (4-5 mm.). P. nigra.
10. Buds round-ovoid. 11.
    Buds distinctly elongated. 21.
11. Fruit hairy, breaking away without a stalk. 12.
    Fruit glabrous. 17.
12. Fruit with dry flesh, splitting. (Almond). 14.
    Fruit succulent. (Peach): 13.
13. Flowers single. P. Persica.
    Flowers double. P. Persica plena.
14. Tree, with green or red twigs. P. communis.
    Shrubs. 15.
15. Bud-scales ciliate: leaves broad. P. triloba.
    Bud-scales not ciliate: leaves narrow. 16.
16. Flowers single. P. japonica.
    Flowers double. P. japonica plena.
17. Fruit breaking from stalk. (Nectarine). P. Persica laevis.
    Fruit with stalk: stone smooth. (Cherries). 18.
18. Leaves whitish, revolute: twigs often red. 19.
    Leaves green, not revolute. 20.
19. Leaves ascending. P. pumila.
    Leaves spreading. P. Besseyi.

20. Leaves nearly as broad as long, glabrous. P. Mahaleb.
    Leaves equally broad: villous. P. tomentosa.
    Leaves distinctly elongated. P. pennsylvanica.
21. Flowers and fruit in umbels. (Cherries). 22.
    Flowers and fruit in racemes. (Bird-cherries). 24.
22. Tree percurrent: leaves rather drooping. 23
    Tree deliquescent: leaves spreading. P. Cerasus.
23. Young leaves hairy. P. avium.
    Young leaves glabrate. P. serrulata.
24. Leaves with incurved teeth: buds brown. P. serotina.
    Leaves with spreading teeth, relatively short. 25.
25. Buds brown: flowers rather large (15 mm.) P. Padus.
    Buds straw-colored: flowers small (10 mm.). P. virginiana.

Family LEGUMINOSAE. Pea Family.

A very large and heterogeneous widespread family comprising some of the most valuable plants of farm and garden, the sweet pea of florists, and many of the most useful plant materials of landscape gardeners, and producing some of the most costly tropical cabinet woods. Through their power of fixing atmospheric nitrogen, even weeds of this family enrich poor soil.

GYMNOCLADUS. Kentucky Coffee Tree.

Deciduous large rough-barked trees with hard pinkish wood with rather large crowded ducts in spring, those of autumn reduced in size and number and in a wavy transverse pattern, and fine medullary rays; stout round twigs with large chocolate-colored continuous pith; alternate somewhat raised large bluntly heart-shaped leaf-scars with about 5 bundle-traces; small if any stipule scars; round indistinctly scaly superposed buds sunken in ciliate craters, the end-bud absent; large abruptly pinnate or bipinnate leaves with entire leaflets; often imperfect pale polypetalous regular flowers with tubular calyx, in terminal panicles; and large thick-walled legumes with large brown seeds.

Base leaves once pinnate: leaflets bristle-pointed. G. dioica.

GLEDITSIA. Honey Locust.

Often large deciduous deliquescent trees mostly with branched spines above the axils; yellowish or finally reddish hard

wood with moderately large ducts crowded in the vernal wood and passing into smaller ones in more or less evident wavy transverse parenchyma-patterns later in the season, and moderate medullary rays replaced at intervals by heavier ones; moderately stout rounded rather zig-zag twigs somewhat swollen at the nodes; angular brown homogeneous pith; alternate low more or less heart-shaped or finally U-shaped leaf-scars with 3 bundle-traces; small rounded sessile superposed more or less concealed buds with several scales, the end-bud lacking; large pinnate or bipinnate leaves with rather crenulate smallish leaflets; inconspicuous polygamous flowers in lateral clusters; and often very large sometimes twisted thin legumes.

1. Spines rounded: leaves mostly once-pinnate. 2.
   Spines flattened or absent: leaves mostly twice-pinnate. 3.
2. Tree. G. sinensis.
   Shrub. G. sinensis nana.
3. Leaves glabrate: pod 1- to 3-seeded. G. aquatica.
   Leaves with pubescent vein-axils: pods many-seeded. 4.
4. Leaflets obtuse or notched, scarcely 20. G. japonica.
   Leaflets rather acute, over twenty. 5.
5. Trees. 6.
   Shrub: unarmed. G. triacanthos elegantissima.
6. Unarmed. G. triacanthos inermis.
   Armed. 7.
7. Scarcely weeping. G. triacanthos.
   Weeping. G. triacanthos Bujotii.

CERCIS. Redbud.

Deciduous shrubs or small trees with smoky or brownish wood with small ducts in wavy patterns or those of the spring somewhat larger and more crowded, and fine but distinct medullary rays; moderately slender zig-zag roundish twigs; roundish or angled homogeneous pale or pinkish pith; alternate 2-ranked raised half-round or 3-angled small leaf-scars with 3 bundle-traces or a single crescent-shaped aggregate; stipule vestiges above the leaf-scar; ovoid superposed lateral buds, the uppermost often somewhat stalked with several exposed scales and

the terminal bud lacking; rather large and heart-shaped slender-stalked palmately nerved entire leaves; small pink or white papilionaceous flowers in axillary umbels; and thin several-seeded legumes.

1. Leaves more or less pointed. 2.
   Leaves rounded or notched at apex. 5.
2. Leaves with a narrow translucent margin. C. chinensis.
   Leaves without translucent border. 3.
3. Flowers reddish. 4.
   Flowers white. C. canadensis alba.
4. Flowers single. C. canadensis.
   Flowers double. C. canadensis plena.
5. Flowers reddish. C. Siliquastrum.
   Flowers white. C. Siliquastrum alba.

CLADRASTIS. Yellow wood.

Small or moderate-sized deciduous trees with smooth gray bark; yellowish moderately hard wood with diffused small ducts and fine but distinct medullary rays; moderate rather zig-zag twigs; rather large roundish homogeneous pale pith; alternate crescent-shaped or horseshoe-shaped low leaf-scars with 1 or 5 at first protruding bundle-traces; no stipule-scars; sessile solitary or superposed lateral buds often aggregated in a conical bud-like group; no end bud; odd-pinnate leaves with large entire short-stalked leaflets; rather large white perfect papilionaceous flowers in a terminal raceme or panicle; and thin few-seeded legumes.

1. Bundle-trace 1; buds glabrate. C. (Maackia) amurensis.
   Bundle-traces 5; buds superposed, silky. 2.
2. Leaves glabrous. 3.
   Leaves somewhat pubescent. C. sinensis.
3. Unvariegated. C. lutea.
   Variegated with yellow. C. lutea aureo-variegata.

SOPHORA. Pagoda Tree.

Deciduous small trees with firm pale wood with small ducts, somewhat larger and crowded in spring and in tangential lines in autumn, and fine medullary rays; somewhat finely fluted

rather slender twigs, rounded or bluntly angular continuous pith; alternate somewhat raised U-shaped leaf-scars partly encircling the buds, with 3 bundle-traces; minute stipule-scars crowning the leaf-cushion; small hairy superposed sessile buds with indistinct scales, the terminal bud lacking; odd-pinnate leaves with stalked entire leaflets; papilionaceous perfect flowers in supra-axillary racemes forming a terminal panicle; and torulose pods.

Not weeping. S. japonica.
Weeping. S. japonica pendula.

LABURNUM. Golden Chain.

Deciduous shrubs or small trees with brown wood with small ducts crowded in spring, wavy anastomosing tangential wood-parenchyma pattern, and fine medullary rays; moderate fluted twigs; rounded homogeneous pale pith; alternate somewhat raised crescent-shaped or transversely elliptical leaf-scars with 3 bundle-traces; short stipules persistent at top of the leaf-scar; solitary sessile round-ovoid buds with 2 or 3 exposed scales; typically entire moderately large nearly sessile leaflets; rather large perfect papilionaceous yellow flowers in racemes; and several-seeded legumes.

1. Leaflets lobed. L. anagyroides quercifolium.
   Leaflets not lobed. 2.
2. Leaves yellow. L. anagyroides aureum.
   Leaves green. 3.
3. Leaves sessile. L. anagyroides sessilifolium.
   Leaves petioled. 4.
4. Leaflets elliptical. 5.
   Leaflets very narrow. L. anagyroides Carlieri.
5. Leaflets flat. 6.
   Leaflets concave. L. anagyroides bullatum.
6. Branches rather spreading. L. anagyroides.
   Branches distinctly drooping. L. anagyroides pendulum.

GENISTA. Whin.

Small deciduous shrubs with slender angular twigs; more or less angled homogeneous pale pith; alternate small raised crescent-shaped or 3-lobed leaf-scars with 3 bundle-traces; more

or less evident persistent stipules; small solitary ovoid buds usually concealed behind the leaf-cushion; small entire apparently simple subsessile leaves; moderately small yellow papilionaceous flowers in the upper axils; and small few-seeded legumes.

1. Spiny. G. germanica.
   Unarmed. 2.
2. Erect: leaves glabrate. (Dyeweed). G. tinctoria.
   Prostrate: leaves silky beneath. G. pilosa.

ULEX. Furze. "Fuzz."

Much-branched shrubs with light wood with minute ducts in an anastomosing flame-like pattern and fine medullary rays; moderate fluted twigs ending in spines; small continuous pith; small alternate pungent linear leaves; rounded small buds; yellow perfect papilionaceous rather larger flowers distributed along the branches; and short few-seeded legumes.

Flowers single. U. europaeus.
Flowers double. U. europaeus plenus.

CYTISUS. Broom.

Deciduous shrubs with brown wood with small ducts in oblique or flame-like patterns and fine medullary rays; rather slender twigs; roundish or angular homogeneous pale pith; alternate raised small transversely elliptical or crescent-shaped leaf-scars with 1 bundle-trace; scarcely evident stipule-scars; small rounded or ovoid solitary buds with 2 or 3 exposed scales, often developing into short leafy spurs the first season; stalked rather small digitate leaves with 3 sessile entire leaflets; rather large perfect papilionaceous flowers in axillary or terminal clusters; and small several-seeded legumes.

1. Twigs prominently angled. C. scoparius.
   Twigs scarcely angled. 2.
2. Twigs with appressed hairs. C. nigricans.
   Twigs with spreading hairs. 3.
3. Leaflets with appressed hairs beneath. C. leucanthus.
   Leaflets with spreading hairs beneath. 4.

4. Leaflets scarcely 20 mm. long: flowers axillary. C. hirsutus.
   Leaflets nearly 25 mm. long: flowers in heads. C. supinus.

AMORPHA. False Indigo.

Deciduous shrubs with slender more or less sulcate branches; rather 3-sided homogeneous pith; white wood with minute ducts, somewhat more crowded in spring and in wavy tangential lines in summer, and fine medullary rays; alternate crescent-shaped somewhat raised leaf-scars with 3 bundle-traces; small stipule-scars; appressed small ovoid buds with about 4 exposed scales; odd-pinnate glandular-punctate leaves; small papilionaceous more or less violet flowers; and small glandular pods.

1. Leaves nearly sessile: gray. (Lead plant). A. canescens.
   Leaves distinctly stalked. 2.
2. Hairy when young. A. fruticosa.
   Glabrous. A. glabra.

WISTERIA. Wistaria.

Deciduous twining shrubs with rather slender subterete twigs; moderate somewhat angled continuous pith; alternate elevated half-round or squarish leaf-scars, short-spurred at base, with 3 compound bundle-traces; no stipule-scars; sessile round or ovoid buds with about 3 exposed scales; large odd-pinnate leaves with short-stalked entire leaflets; perfect showy papilionaceous flowers in terminal panicles; and moniliform legumes with several large plump seeds.

1. Flowers appearing before the leaves, scentless. 2.
   Flowers appearing after the leaves, fragrant. 3
2. Panicles 30 cm. long. W. floribunda.
   Panicles 50-90 cm. long. W. floribunda macrobotrys.
3. Panicles short (8-10 cm.), glandless. W. frutescens.
   Panicles moderate (15 cm. or more): pedicels and calyx pubescent and also glandular-papillate. W. macrostachys.

ROBINIA. Locust. Rose Acacia.

Deciduous trees, sometimes with stipular spines, with hard yellow and brown wood with the larger ducts somewhat crowded

in spring and the smaller in tangential waves in the fall growth, and moderate medullary rays; moderate zig-zag roundish twigs; roundish continuous pith; alternate raised leaf-scars, for a time concealing the small superposed rounded buds and with 3 bundle-traces; bristle-like or spinescent stipules; no end-buds; typically odd-pinnate leaves with entire stipellate leaflets; showy perfect papilionaceous white or rosy flowers in axillary racemes; and rather small flat few-seeded legumes.

1. Twigs neither glandular nor bristly. 2.
   Twigs bristly. 9.
   Twigs with sticky glands, not bristly. R. viscosa.
2. Tree round or ovoid. 3.
   Tree pyramidal. R. Pseudacacia pyramidalis.
3. Unarmed. 4.
   With stipular spines. 5.
4. Branching open. R. Pseudacacia inermis.
   Branching compact. R. Pseudacacia umbraculifera.
5. Leaves mostly of only 1 leaflet. R. Pseudacacia monophylla.
   Leaves distinctly compound. 6.
6. Weeping R. Pseudacacia pendula.
   Not weeping. 7.
7. Leaves green. 8.
   Leaves yellow. R. Pseudacacia aurea.
8. Flowers white. R. Pseudacacia.
   Flowers rosy. R. dubia.
9. Without sticky glands. R. hispida.
   With both glands and bristles. R. neo-mexicana.

COLUTEA. Bladder Senna.

Deciduous shrubs with more or less shredding bark; rounded or angular twigs; rather angular homogeneous pale pith; alternate small somewhat raised crescent-shaped leaf-scars with 1 or usually 3, 5 or 7 bundle-traces in a single series; more or less persistent soft stipules above the leaf-scars; round-ovoid solitary sessile small buds with 2-4 exposed scales; odd-pinnate leaves with moderately small entire short stalked leaflets; rather

large papilionaceous flowers in stalked axillary clusters; and thin-walled inflated stalked few-seeded legumes.

Leaves flat. C. arborescens.
Leaves crisped. C. arborescens crispa.
Leaves concave. C. arborescens bullata.

HALIMODENDRON. Salt Tree.

Deciduous armed shrubs with moderate roundish twigs; roundish pale continuous pith; alternate raised crescent-shaped leaf-scars with 1 bundle-trace; minute stipule scars; ovoid sessile buds with several exposed scales; abruptly pinnate small leaves with the rachis ending in a spine beyond the few leaflets; rather large rosy papilionaceous perfect flowers, slender-stalked on swollen short spurs; and short slender-stalked swollen legumes with several small rounded seeds.

Leaflets bristle-tipped. H. halodendron.

CARAGANA. Pea Tree.

Deciduous shrubs often with leaf- or stipule-spines; moderate or slender often angled twigs; angled often spongy or evanescent pale pith; alternate raised small crescent-shaped leaf scars with 1 bundle-trace, flanked by persistent stipules; ovoid rather large and appressed solitary sessile buds with several exposed scales; abruptly pinnate or subdigitate leaves with rather small entire often mucronate leaflets and prolonged rachis; perfect moderate-sized yellow papilionaceous flowers usually in small clusters from axillary spurs; and not greatly swollen legumes.

1. Stipules and rachis-tip bristle-like: leaves digitate. C. frutex.
   Stipules pungent: rachis bristle-like: leaves pinnate. 2.
   Rachis pungent-tipped. 3.
2. Leaves short, elliptical-obovate. C. arborescens.
   Leaves elongated, linear-spatulate. C. arborescens Lorbergii.
3. Rachis persisting as a spine after fall of leaflets. C. spinosa.
   Rachis not persistent: leaflets few. 4.
4. Leaflets distinctly pinnate. C. Chamlagu.
   Leaflets appearing digitate, narrow. C. pygmaea.

CALOPHACA.

Deciduous shrubs (or grafted as small standard trees) with slender terete twigs; small roundish continuous pith; alternate minute low roundish leaf-scars with a single bundle-trace; narrow stipule-scars or persistent triangular stipules; small sessile buds with few loose scales; odd-pinnate leaves with small round entire sessile leaflets; rather large perfect papilionaceous flowers in sparse racemes; and terete pods.

Leaflets about 15: flowers under 10. C. wolgarica.
Leaflets about 20: flowers about 12. C. grandiflora.

PUERARIA. Kudzu Vine.

Herbaceous twining plants, woody and persistent only at the base, with alternate trifoliolate leaves with very large-lobed leaflets; and (in warm enough regions) perfect purple papilionaceous flowers in axillary spikes, followed by long legumes.

Leaflets rather rhombic-ovate, ciliate. P. hirsuta.

Family RUTACEAE. Rue Family.

A moderate sized family, chiefly important commercially as producing the *Citrus* fruits; somewhat used in ornamental planting.

TRIPHASIA. Limeberry.

Evergreen shrubs with pale hard wood with minute diffused ducts and fine medullary rays; rather slender green twigs; paired axillary spines; no stipule scars; alternate trifoliolate pellucid-punctate leaves; moderately small perfect polypetalous white fragrant flowers solitary in the axils; and thick-skinned red berries with 1 or more very large seeds.

Glabrous: terminal leaflet enlarged. T. trifolia.

PTELEA. Hop Tree.

Deciduous shrubs or small trees with soft wood with larger crowded vernal ducts and small summer ducts in wavy tangential patterns, and fine medullary rays; rather slender roundish twigs with round continuous pith; alternate little-raised finally horseshoe-shaped leaf-scars with 3 bundle-traces; no stipule-scars; small hairy superposed lateral buds but no end bud;

palmately trifoliolate stalked leaves with large nearly entire pellucid-punctate leaflets; rather small perfect open polypetalous flowers in compound corymbs; and densely clustered slender-pedicelled round veiny samaras.

1. Twigs glabrous. 2.
   Twigs finely tomentose. P. trifoliata mollis.
2. Leaves green. P. trifoliata.
   Leaves yellow. P. trifoliata aurea.

PHELLODENDRON. Cork Tree.

Small deciduous trees with soft-corky bark; brown wood with rather large ducts crowded in the spring wood and minute ducts in wavy tangential lines in summer, and fine medullary rays; rather stout rounded twigs; crenate continuous white pith; opposite or alternate, but then 4-ranked, somewhat elevated horseshoe shaped leaf-scars with 3 simple or compound bundle-traces; no stipule scars; small hairy edged buds; abruptly pinnate leaves with several nearly entire leaflets; small dioecious greenish flowers in stalked terminal clusters; and black several-seeded berry-like drupes.

Leaflets lanceolate, slightly crenulate. P. amurense

SKIMMIA.

Evergreen shrubs with alternate subsessile simple pellucid-glandular leaves; small imperfect polypetalous white flowers in terminal clusters; and rather small red berry-like fruits.

Leaves oblong or obovate. S. japonica.

ZANTHOXYLUM. Prickly Ash.

Deciduous (or in warm countries evergreen) aromatic shrubs or small trees with yellowish wood with minute ducts, slightly smaller and less crowded in summer, and fine medullary rays; moderate rounded twigs with prickles (sometimes a pair beside each leaf-scar); rounded continuous pith; alternate somewhat raised half-round or 3-lobed leaf-scars with 3 bundle-traces; no stipule-scars; round red-hairy superposed buds with indistinct scales; odd-pinnate pellucid-punctate moderate sometimes prickly leaves; small dioecious polypetalous flowers in axillary

clusters or panicled; and small leathery capsules, each with 1 or 2 round black seeds.

1. Prickles by leaf-bases large, deltoid-acuminate. Z. Bungei.
   Prickles not greatly dilated at base. 2.
2. Flowers panicled: leaflets glossy, falcate. Z. Clava-herculis.
   Flowers clustered in the axils. Z. americanum.

Family SIMARUBACEAE. Quassia Family.

A rather small family of little economic importance; chiefly known in temperate regions through the too-common use of the tropical-appearing ailanthus.

AILANTHUS. Tree of Heaven.

Loosely branched deciduous trees with rather smooth coarsely lenticeled bark; yellowish soft wood with rather large spring ducts, tangentially disposed summer ducts, and distinct medullary rays; stout twigs with homogeneous colored pith; half-round buds with 2 or 4 exposed scales, the place of the terminal represented by a large scar; alternate odd-pinnate large leaves with somewhat toothed leaflets bearing nectar-glands beneath on some of the teeth; small dioecious polypetalous panicled flowers; and elongated somewhat twisted samaras.

1. Twigs prickly. A. Vilmoriniana.
   Unarmed. 2.
2. Twigs finely pubescent. 3.
   Twigs glabrous. A. glandulosa pendulifolia.
3. Fruit green. A. glandulosa.
   Fruit red. A. glandulosa erythrocarpa.

Family MELIACEAE. Chinaberry Family.

A small chiefly tropical family producing mahogany, the valuable West Indian "cedar" or cigar-box wood; a few forms used for shade trees.

CEDRELA. False Cedar.

Deciduous rather smooth-barked trees resembling *Ailanthus*, with brown mahogany-like wood with large ducts crowded in spring but small and fewer in summer, and fine medullary rays; stout twigs; large round colored homogeneous pith; alternate

large low broadly heart-shaped leaf-scars with 5 bundle-traces; no stipule-scars; round buds with several exposed scales, the terminal bud present and broadly conical; large odd-pinnate leaves with pointed serrate short-stalked glandless leaflets; small whitish usually perfect polypetalous panicled flowers; and capsular fruit with winged seeds.

Leaves merely paler beneath. C. sinensis.
Leaves glaucous beneath. C. serrata.

MELIA. China Berry.

Deciduous trees with firm brown wood with small ducts more crowded in spring and somewhat undulately tangentially lined in summer, and rather fine medullary rays; moderate terete twigs; round continuous pith; somewhat raised 3-lobed leaf-scars with 3 compound bundle-traces; rounded sometimes superposed buds with few exposed scales; twice or thrice pinnate long-petioled leaves with toothed leaflets; perfect polypetalous open lilac loosely clustered flowers with monadelphous stamens; and moderate-sized round yellowish translucent berry-like drupes.

Tree round topped. M. Azedarach.
Tree umbrella-shaped. M. Azedarach umbraculiformis.

Family EUPHORBIACEAE. Spurge Family.

A very large widespread family, largely herbs, with milky acrid sap; yielding Brazilian India-rubber, cassava or tapioca, the principal bread-stuff of the tropics, the source of medicinal croton oil and castor oil, and including the poinsettia and "crotons" of florists. The castor bean is much used for tall temporary foliage masses.

ANDRACHNE.

Deciduous small shrubs with slender fluted twigs; small 3-sided continuous brown pith; alternate small somewhat raised half-elliptical leaf-scars with a single bundle-trace; narrow stipule-scars or elongated persistent stipules; sessile ovoid buds with several exposed ciliate scales; rather small simple entire short-petioled leaves; monoecious polypetalous or apetalous in-

conspicuous slender-stalked axillary flowers; and depressed 3-lobed capsules with six 3-sided pale seeds.

Leaves elliptical, glabrescent. A. phyllanthoides.

SECURINEGA.

Deciduous small shrubs with slender somewhat angled twigs; relatively large rounded or angular continuous white pith; alternate small raised crescent-shaped leaf-scars with a single bundle trace; no stipule scars; sessile ovoid buds with several exposed scales; subelliptical slender-petioled leaves; small imperfect apetalous flowers, clustered in the axils; and small 3-lobed few-seeded capsules.

Leaves acute at both ends, entire, pale beneath. S. ramiflora.

Family BUXACEAE. Box Family.

A rather small family producing the boxwood formerly much used in wood-engraving, but otherwise of little use. The box is the most highly esteemed plant for clipped evergreen hedges where it endures the climate, and, in tubs, often takes the place of laurel for formal specimens.

BUXUS. Box Tree.

Evergreen shrubs or small trees with hard close-grained wood; slender 4-sided branches; small roundish homogeneous pith; opposite small crescent-shaped decurrent leaf-scars with 1 transverse bundle-trace; multiple buds with several loose scales; ovate to obovate sessile small entire leaves; small monoecious apetalous nearly sessile flowers in axillary clusters; and small 3-valved capsules.

1. Leaves broadest at or below the middle: twigs pubescent. 2.
   Leaves broadest above the middle: twigs glabrous. 5.
2. Leaves green. 3.
   Leaves variegated. 4.
3. Leaves not glaucous. B. sempervirens
   Leaves glaucous beneath. B. sempervirens glauca.
4. Leaves white-bordered. B. sempervirens argentea.
   Leaves yellow-bordered. B. sempervirens marginata.
   Leaves yellow. B. sempervirens aurea.

5. Low or prostrate. B. microphylla.
Moderately high. B. japonica.

PACHYSANDRA.

More or less evergreen softwooded perennials with alternate relatively large wing-petioled toothed leaves clustered toward the ends of the short erect shoots; small white or purplish monoecious apetalous spiked flowers; and small 3-lobed capsules.

Leaves coarsely crenate: flowers at top. P. terminalis.
Leaves crenately lobed: flowers at base. P. procumbens.

Family EMPETRACEAE. Crowberry Family.

A small family of low evergreens, chiefly in cold regions.

EMPETRUM. Crowberry.

Low matted evergreen shrubs with slender twigs; small raised crescent-shaped leaf-scars with 1 bundle-trace, usually in whorls of 3; no stipule-scars; small round sessile solitary buds with few scales; small narrow crowded entire leaves; inconspicuous apetalous polygamous flowers; and relatively large berry-like fruits.

1. Leaves scarcely reflexed: twigs tomentose. 2.
Lower leaves reflexed: twigs glandular or glabrate. E. nigrum.
2. Leaves rather spreading: fruit opaque. E. atropurpurum.
Leaves ascending: fruit translucent. E. Eamesii.

COREMA. Broom Crowberry.

Evergreen low shrubs with slender fluted twigs; minute continuous pith; alternate elevated crescent-shaped minute leaf-scars with a single bundle-trace; no stipule scars; small globose sessile buds with several exposed scales; minute oblong nearly sessile blunt green leaves; small apetalous polygamous flowers clustered at ends of the branches; and several-seeded small dry drupes.

Leaves minutely serrulate, grooved on both faces. C. Conradii.

Family ANACARDIACEAE. Sumach Family.

A small family, chiefly of warm regions, yielding mangoes, cashew apples and cashew nuts, pistacio nuts, and the lacquer

of Japan; notable among the plants of temperate regions as including the very poisonous poison ivy and poison sumach,—the former an attractive but ineradicable climber, and the latter an unusually beautiful shrub.

RHUS. Sumach.

Deciduous shrubs or straggling small trees with aromatic resinous or milky sap; soft reddish or greenish wood with small ducts, decreasingly smaller or in wavy transverse patterns in the summer growth, and fine medullary rays; usually stout roundish or 3- or 5-sided twigs with large pith of similar shape; alternate somewhat raised triangular or C-shaped large leaf-scars; roundish sessile buds; pinnate leaves with mostly toothed or sometimes incised lanceolate leaflets; small often imperfect polypetalous yellowish flowers in axillary or terminal clusters; and small often dry drupe-like fruit. The true sumachs are sometimes separated as *Schmaltzia*, and the name *Toxicodendron* used for the poisinous group.

1. Leaflets three. 2.
   Leaflets 5 or more. 4.
2. Fruit red, pubescent. R. canadensis.
   POISONOUS. Fruit white, glabrous. 3.
3. Prostrate or climbing by roots: leaflets thin, scarcely lobed. (Poison ivy). R. radicans.
   Bushy: leaflets firm, often deeply lobed. (Poison oak). R. Toxicodendron.
4. POISONOUS. Fruit white, glabrous: leaflets entire. (Poison sumach). R. Vernix
   Fruit red, pubescent. 5.
5. Rachis winged between the leaflets. 6.
   Rachis not winged. 7.
6. Leaflets entire, glossy, glabrous beneath. R. copallina.
   Leaflets toothed, hairy beneath R. javanica.
7. Glabrous. 8.
   Hairy. 9.
8. Leaflets serrate. R. glabra.
   Leaflets deeply cut. R. glabra laciniata.

9. Leaflets serrate. R. typhina.
   Leaflets deeply cut. R. typhina laciniata.
   Leaflets twice-divided. R. typhina dissecta.

COTINUS. Smoke Tree.

Aromatic-gummy deciduous shrubs or very small trees with soft yellow wood with crowded moderate ducts in the spring growth, dotted or transverse groups of minute ducts in the summer growth, and fine but evident medullary rays; roundish twigs; alternate raised crescent-shaped or 3-lobed rather small leaf-scars with 3 or 5 bundle-traces; entire moderately large slender-stalked simple leaves; inconspicuous polypetalous flowers in terminal panicles; and small dry fruits on feathery slender stalks. Frequently placed under *Rhus*.

1. Leaves rather round and small (scarcely 8 cm. long). 2.
   Leaves elliptical and large (10-16 cm. long). C. americanus.
2. Not weeping. 3.
   Weeping: C. Coggygria pendulus.
3. Leaves somewhat pubescent. C. Coggygria pubescens.
   Leaves glabrous. 4.
4. Hairs of inflorescence pale. C. Coggygria.
   Hairs of inflorescence purple. C. Coggygria atropurpureus.

Family CYRILLACEAE.

A small family of no considerable use: the following sometimes found in shrubberies.

CYRILLA. Black ti-ti.

Subevergreen shrubs or small trees with rather hard brownish wood with minute diffused ducts and fine but evident medullary rays; rather slender 3-angled twigs; alternate somewhat raised triangular small leaf-scars with 1 bundle-trace; solitary sessile small buds with several loose pointed scales: simple moderately small cuneately short-stalked leaves; small colorless perfect polypetalous flowers densely clustered in racemes from the winter nodes; and small ovoid capsules on reflexed pedicels.

Leaves subacuminate, revolute, raised-veiny. C. racemiflora.

CLIFTONIA. Buckwheat Tree.

Evergreen hard-leaved shrubs with rounded smooth-barked twigs; small rounded homogeneous pink pith; alternate low obtusely triangular leaf-scars with a single simple or compound bundle-trace; no stipule-scars; small solitary compressed-ovoid sessile buds with about 2 scales; moderately small subsessile entire nearly veinless leaves; rather small perfect whitish polypetalous flowers in terminal racemes; and small rounded 3-winged dry fruit.

Leaves slightly revolute, more or less downy. C. monophylla.

Family AQUIFOLIACEAE. Holly Family.

A rather small but widespread family, chiefly of deciduous shrubs; the larger species yield a fine-grained wood, and many are attractive through their persistent bright colored fruit.

ILEX. Holly.

Evergreen or deciduous shrubs or small trees with white wood with minute diffused ducts and fine crowded medullary rays; moderate or slender rather 3-sided twigs; somewhat angular continuous pith; alternate somewhat raised crescent-shaped leaf-scars with a sometimes broken bundle-trace; minute stipule-scars or persistent stipules; ovoid sessile buds with about 3 exposed scales; simple petioled moderate or small leaves; small more or less imperfect whitish polypetalous flowers in the axils; and rather small few-seeded berry-like drupes.

1. Evergreen. 2.
   Deciduous. 5.
2. Leaves relatively large, pungently pointed or toothed. 3.
   Leaves rather small, not pungent: fruit black. I. glabra.
3. Leaves very glossy. I. Aquifolium.
   Leaves dull. 4.
4. Fruit red. I. opaca.
   Fruit yellow. I. opaca xanthocarpa.
5. Leaves very small (2 cm.). I. crenata.
   Leaves moderate. 6.

6. Leaves sharply serrate: nutlets not ridged. 7.
   Leaves crenately toothed: nutlets ribbed. I. decidua.
7. Fruit red. I. verticillata.
   Fruit yellow. I. verticillata chrysocarpa.

NEMOPANTHUS. Mountain Holly.

Deciduous glabrous shrubs with slender terete twigs; small continuous somewhat 3-sided pith; alternate slightly raised crescent- or shield-shaped leaf-scars with a single bundle-trace; scarcely evident minute stipule-scars; ovoid sessile buds with about 3 exposed scales; rather small slender-petioled often entire leaves; small whitish polypetalous often imperfect usually solitary flowers long-pedicelled from the axils; and small red berry-like drupes with several hard nutlets.

Leaves oblong to elliptical, mucronulate. N. mucronata.

Family CELASTRACEAE. Spindle Tree Family.

A small family of little use apart from their employment in landscape work, for which their bright seeds render them attractive.

CELASTRUS. Bittersweet.

Deciduous woody twiners with soft pale wood with (in our species) rather large ducts in spring and minute scattered summer ducts, and moderately fine medullary rays; rounded stems; round homogeneous pale pith; alternate slightly raised decurrent half-round leaf-scars with a compound crescent-shaped bundle-trace; no stipule-scars; round sessile solitary buds with several exposed scales; large stalked low-crenate leaves; rather small white perfect polypetalous flowers in axillary clusters; leathery orange capsules; and brilliant red-arillate seeds.

Fruits few, in short axillary clusters. C. orbiculatus.
Fruits numerous, in terminal clusters. C. scandens.

EVONYMUS. Burning Bush. Spindle Tree.

Shrubs or small trees with white or yellowish firm wood with innumerable minute diffused ducts and extremely fine medullary rays; more or less angular or winged moderately slen-

der often green twigs; round or angular continuous or spongy or evanescent pale pith; opposite somewhat raised crescent-shaped leaf-scars with a crescent-shaped bundle-trace; minute stipule-scars; usually elongated solitary sessile buds with several pairs of rather fleshy scales; medium-sized stalked toothed or crenate leaves; small whitish or lurid perfect polypetalous flowers in stalked axillary clusters; and usually pink leathery capsules with several rather large red-arillate seeds.

1. Creeping, trailing, or climbing. 2.
   Bushy or tree-like. 7.
2. Climbing by roots: leaves small (1.5-5 cm.). 3.
   Not climbing. 5.
3. Leaves not variegated. E. radicans.
   Leaves white-margined. E. radicans argenteo-marginata.
   Leaves margined with red. E. radicans roseo-marginata.
   Leaves white-veined. 4.
4. Leaves rather large. E. radicans reticulata.
   Leaves small (scarcely 1.5 cm.). E. radicans minima.
5. Leaves linear, narrow. E. nana.
   Leaves obovate, broad. 6.
6. Leaves not variegated. E. obovata.
   Leaves variegated. E. obovata variegata.
7. Evergreen. 8.
   Deciduous. 15.
8. Leaves not variegated. 9.
   Leaves variegated. 12.
9. Round-topped. 10.
   Conical or oblong. E. japonica columnaris.
10. Leaves green. E. japonica.
    Leaves yellow when young. 11.
11. Young leaves light yellow. E. japonica pallens.
    Young leaves golden. E. japonica aurea.
12. Variegation marginal. 13.
    Variegation median. 14.
13. Margin white. E. japonica albo-marginata.
    Margin yellow. E. japonica aureo-marginata.

14. Middle bright yellow. E. japonica medio-picta.
Middle green and yellow. E. japonica viridi-variegata.
15. Twigs with corky wings or warts. 16.
Twigs neither winged nor conspicuously warty. 17.
16. With wings. E. alata.
With prominent warts. E. verrucosa.
17. Fruit roughened: petals 5. E. americana.
Fruit smooth: petals four. 18.
18. Carpels nearly separate. E. alata subtriflora.
Fruit merely lobed. 19.
19. Buds long (10 mm.): fruit lobes winged. E. latifolia.
Buds short (5 mm.): fruit not winged. 20.
20. Flowers whitish, few in a cluster. 21.
Flowers purple, numerous. E. atropurpurea.
21. Fruit pink. 22.
Fruit whitish. E. europaea leucocarpa.
Fruit purple. E. europaea atrorubens.
22. Leaves green. 23.
Leaves purplish. E. europaea atropurpurea.
23. Tall. E. europaea.
Very dwarf. E. europaea nana.

PACHISTIMA.

Low evergreen shrubs with minute dark pith; slender 4-sided or 4-lined twigs; opposite somewhat raised crescent-shaped small leaf-scars with 3 more or less distinct bundle-traces; ovoid buds with about 2 pairs of exposed scales; small leathery nearly sessile usually serrulate leaves; minute perfect polypetalous 4-merous greenish or reddish flowers in the axils; and small capsules with few white-arillate seeds.

Flower-stalks very short. P. procumbens.
Flower-stalks elongated, very slender. P. Canbyi.

Family STAPHYLEACEAE. Bladdernut Family.

A small family of shrubs, of no use except in landscape planting.

STAPHYLEA. Bladdernut.

Deciduous shrubs with soft pale wood with minute diffused ducts and fine medullary rays; moderate rounded twigs; rather large continuous pith; opposite half-round somewhat raised leaf-scars with about 10 bundle-traces in a C- or O-shaped series; no stipule scars; ovoid sessile buds with 2 or 4 exposed scales; petioled trifoliolate or odd-pinnate leaves with ovate or lanceolate crenulate or serrate rather large leaflets; smallish white polypetalous perfect flowers in stalked clusters; and large bladder-like 3-celled fruit with few seeds.

1. Leaflets three. 2.
   Leaflets usually 5 or 7. S. pinnata.
2. Terminal leaflet very short-stalked. S. Bumalda.
   Terminal leaflet distinctly stalked. S. trifolia.

Family ACERACEAE. Maple Family.

A rather small family of trees and shrubs yielding important cabinet woods, and the source of the much esteemed maple sugar: containing some of the best shrubs and street trees.

ACER. Maple. Box-elder.

Deciduous shrubs or trees with commonly rough bark in age; rather brown often hard wood with minute diffused ducts and rather fine but distinct medullary rays; round homogeneous pale pith; slender to stout nearly terete twigs; opposite narrow U-shaped leaf-scars with usually 3 or 5 bundle-traces in a single series; ovoid or conical buds, occasionally stalked and with 2 valvate outer scales but mostly with several visible pairs of scales; usually palmately veined and lobed leaves (exceptionally unlobed, and palmately or pinnately compound in the group *Negundo*, etc.); usually imperfect and small often greenish polypetalous or apetalous flowers variously clustered; and rather large paired wing-fruits.

1. Buds distinctly stalked, with 2 valvate scales. 2.
   Buds essentially sessile. 3.
2. Twigs and buds glabrous. A. pennsylvanicum.
   Twigs and buds pubescent: leaves serrate. A. spicatum.

3. Buds with two scales: leaves many-lobed. 4.
   Buds with several exposed scales. 13.
4. Pubescent for a time: lobes typically short. 5.
   Glabrous: lobes separated fully half-way to base. 7.
5. Lobes short. 6.
   Lobes separated nearly to base. A. japonicum Parsonii.
6. Leaves green. A. japonicum.
   Leaves yellow. A. japonicum aureum.
7. Leaves not variegated. 8.
   Leaves variegated. 11.
8. Leaves green. 10.
   Leaves purple. A. palmatum atropurpureum.
   Leaves red. 9.
9. Lobes broad. A. palmatum sanguineum.
   Lobes dissected. A. palmatum ornatum.
10. Lobes dissected. A. palmatum dissectum.
    Lobes broad. A. palmatum.
11. Lobes broad. 12.
    Lobes dissected: mottled. A. palmatum Frederici-Guilelmi.
12. Leaves mottled. A. palmatum bicolor.
    Leaves rosy-margined. A. palmatum roseo-marginatum.
13. Leaf-scars glandular at top: leaves compound. (Box-elder). 14.
    Leaf-scars not glandular: leaves simple. 19.
14. Twigs green. 15.
    Twigs deep purple. A. Negundo violaceum.
15. Leaves not variegated. 16.
    Leaves variegated. 17.
16. Leaves green. A. Negundo.
    Leaves yellow. A. Negundo auratum.
17. Leaves mottled. A. Negundo aureo-maculatum.
    Variegation marginal. 18.
18. Margin white. A. Negundo argenteo-variegatum.
    Margin yellow. A. Negundo aureo-marginatum.
19. Buds ovoid or short-conical. 20.
    Buds conical, pointed, gray-pubescent. (Sugar maples). 50.

20. Buds glabrate, green or red with rather fleshy scales. 21.
Buds gray-pubescent. 48.
21. Buds small (scarcely 5 mm.). 22.
Buds large (the terminal 5 mm. or more), solitary. 32.
22. Buds not becoming multiple. 23.
Buds becoming multiple. 24.
23. Leaves ovate, scarcely lobed. A. tataricum.
Leaves with a middle and two lateral lobes. A. ginnala.
24. Bark flaking in age: lobes of leaves widened upwards: flowers without petals. (Silver maple). 25.
Bark not flaking: lobes of leaves narrowed upwards: flowers with red petals, fragrant. (Red maple). 31.
25. Leaves not variegated. 26.
Leaves pale-mottled. A. saccharinum albo-variegatum.
26. Not weeping. 27.
Weeping: leaves laciniate. A. saccharinum Weirii.
27. Leaves green. 28.
Leaves yellow. A. saccharinum lutescens.
28. Leaves with broad lobes. 29.
Leaves laciniate. 30.
29. Lobes moderately separated. A. saccharinum.
Lobes very deeply separated. A. saccharinum tripartitum.
30. Lobes flat. A. saccharinum heterophyllum.
Lobes crisped. A. saccharinum crispum.
31. Tree round or ovoid. A. rubrum.
Tree oblong-pyramidal. A. rubrum columnare.
32. Leaf-scars meeting: sap milky. (Norway maple). 33.
Leaf-scars not meeting: sap not milky. 43.
33. Leaves not variegated. 34.
Leaves variegated. 40.
34. Leaves green. 35.
Leaves red or purple. 38.
35. Tree round-topped. 36.
Tree oblong. A. platanoides columnare.
36. Leaves broad-lobed. 37.
Leaves deeply dissected. A. platanoides dissectum.

37. Lobes moderately separated A. platanoides.
Lobes separated nearly to base. A. platanoides laciniatum.
38. Leaves 5-lobed. 39.
Leaves 3-lobed, purple, then green. A. platanoides Stollei.
39. Leaves from green becoming red. A. platanoides rubrum.
Leaves red becoming green. A. platanoides Schwedleri.
40. Leaves white-mottled. A. platanoides albo-variegatum.
Leaves margined with white or yellow. 41.
41. Margin white, young leaves red. A. platanoides Drummondii.
Margin yellow. 42.
42. Young leaves red. A. platanoides Wittmackii.
Young leaves green. A. platanoides aureo-marginatum.
43. Tree round-topped. (Sycamore maple). 44.
Tree oblong-conical. A. pseudoplatanus nervosum.
44. Leaves not variegated. 45.
Leaves mottled. 46.
45. Leaves green. A. pseudoplatanus.
Leaves yellow. A. pseudoplatanus Worlei.
Leaves purple. A. pseudoplatanus purpurascens.
46. Leaves green. A. pseudoplatanus bicolor.
Leaves red or purple when young. 47.
47. Uniformly mottled. A. pseudoplatanus albo-variegatum.
With large and small spots. A. pseudoplatanus quadricolor.
48. Leaves glaucous beneath, glabrous. A. monspessulanum.
Leaves green and usually pubescent beneath. 49.
49. Not variegated. A. campestre.
Leaves mottled. A. campestre argenteo-variegatum.
50. Petioles widened at base so as to conceal the buds, often with stipules. (Black maple). A. nigrum.
Petioles not concealing the buds. 51.
51. Tree ovoid. (Sugar maple). A. saccharum.
Tree columnar. A. saccharum monumentale.

Family HIPPOCASTANACEAE. Horsechestnut Family.

A small family of little use except for planting, but including some excellent shade and street trees.

AESCULUS. Buckeye. Horsechestnut.

Usually ovoid deciduous trees, but sometimes shrubs, with more or less soft-corky gray or dark bark; pale rather soft wood with minute diffused ducts and extremely fine medullary rays; stout terete twigs; large somewhat hexagonal homogeneous pale pith; large digitate leaves; large opposite shield-shaped leaf-scars with 3 or several bundle-traces in a single series; ovoid buds, the terminal large, with several pairs of exposed opposite scales; perfect paniculate showy polypetalous flowers; and leathery capsules with 1 or several very large roundish seeds.

1. Buds gummy: leaflets subsessile, impressed-veiny. (Horsechestnuts). 2.
   Buds not gummy. (Buckeyes). 12.
2. Buds persistently gummy: leaflets often seven. 3.
   Bud-scales less persistently gummy, margined: leaflets usually 5. × A. carnea.
3. Trees. 4.
   Shrubs. A. Hippocastanum pumila.
4. Leaves unvariegated. 5.
   Leaves variegated. 11.
5. Leaflets merely toothed. 6.
   Leaflets deeply cut. 9.
6. Tree with ovoid top. 7.
   Tree with round top. A. Hippocastanum umbraculifera.
   Tree pyramidal. A. Hippocastanum pyramidalis.
7. Flowers single. A. Hippocastanum.
   Flowers double. 8.
8. Flowers yellowish red. A. Hippocastanum Schirnhoferi.
   Flowers white. A. Hippocastanum Baumannii.
9. Tree with ovoid top. 10.
   Tree rather pyramidal. A. Hippocastanum Henkelii.
10. Leaflets of usual outline. A. Hippocastanum laciniata.
    Leaflets short and broad. A. Hippocastanum incisa.
11. Variegation yellow. A. Hippocastanum variegata.
    With white blotches. A. Hippocastanum Memmingeri.

12. Fruit warty: bark softly corky. 13.
    Fruit not warty. 14.
13. Tree: leaflets mostly 5. (Ohio buckeye). A. glabra.
    Shrub: leaflets mostly 7. A. glabra Buckleyi.
14. Leaflets characteristically five. 15.
    Leaflets often 7: shrubs: flowers white. A. parviflora.
15. Petals without marginal glands. 16.
    Petals fringed with glands. 17.
16. Flowers yellow: tree. A. octandra.
    Flowers red or reddish: shrub. A. georgiana.
17. Petals ciliate and glandular. × A. hybrida.
    Petals only glandular. 18.
18. Leaves glabrate: flowers red. 19.
    Leaves very pubescent beneath: calyx red. 22.
19. Trees. 20.
    Shrub. A. Pavia humilis.
20. Leaflets finely toothed. 21.
    Leaflets deeply cut-toothed. A. Pavia sublaciniata.
21. Flowers rather bright red. A. Pavia.
    Flowers very dark red. A. Pavia atrosanguinea.
22. Tree: petals red or yellow. A. discolor.
    Shrubs. 23.
23. Petals bright red. A. discolor mollis.
    Petals yellow. A. discolor flavescens.

Family SAPINDACEAE. Soapberry Family.

A rather small family of little use except in landscape planting.

XANTHOCERAS.

Deciduous shrubs or small trees with yellow wood; rather slender terete twigs; relatively large round continuous brownish pith; alternate somewhat raised crescent-shaped leaf-scars with 3 more or less compound bundle-traces; no stipule-scars; ovoid sessile buds with several exposed scales; odd-pinnate rather large leaves with sessile leaflets; relatively large showy polypetalous panicled white flowers; and moderate leathery capsules with several rather large seeds.

Leaflets lanceolate, sharply serrate. X. sorbifolia.

KOELREUTERIA. Varnish Tree.

Deciduous trees with pale wood with small ducts, larger and more crowded in spring, and fine closely but unequally spaced medullary rays; moderate rounded twigs; roundish continuous rather large pith; alternate raised or moderate shield- or crescent-shaped leaf-scars with 3 sometimes compound bundle-traces; no stipule-scars; sessile broadly ovoid buds with about 2 exposed pointed scales; odd-pinnate large leaves with coarsely toothed leaflets; small yellow perfect polypetalous flowers in large panicles; and bladder-like few-seeded fruits.

Leaflets often lobed as well as toothed. K. paniculata.

SAPINDUS. Soapberry.

Usually trees, evergreen or deciduous, with scaly brown bark; yellowish ring-porous wood with wavy tangential wood-parenchyma pattern and very fine medullary rays; rather slender somewhat angled twigs; continuous roundish pith; alternate somewhat raised shield-shaped leaf-scars with 3 groups of aggregated bundle-traces; no stipule-scars; abruptly pinnate leaves, with oblique falcate entire firm veiny leaflets; superposed scaly round buds; inconspicuous polygamous polypetalous flowers in terminal clusters; and round finally black berries with hard seeds.

Leaflets acuminate: petals ovate. S. Drummondii.

Family RHAMNACEAE. Buckthorn Family.

A rather small family, yielding the drug cascara sagrada; the fruit of one *Zizyphus* is supposed to be the intoxicating lotus of the ancients: some species are used in shrubbery masses.

BERCHEMIA. Supple-Jack.

Deciduous twiners with tender terete stems with round homogeneous pith; brownish wood with rather small diffused ducts and fine medullary rays; alternate small raised elliptical or crescent-shaped leaf-scars with 1 elliptical bundle-trace; appressed ovoid-conical buds with about 2 exposed scales; nearly entire rather ovate moderate leaves; small more or less polyga-

mous greenish-white polypetalous flowers in small lateral clusters; and elongated 2-seeded small drupes.

Leaves with about 8 pairs of veins, cordate. B. racemosa.
Leaves with about 10 pairs of veins, not cordate. B. scandens.

CEANOTHUS. New Jersey Tea.

Small deciduous half-shrubs, in the east, with red-brown wood with minute ducts diminishing in size and number through the season, and fine medullary rays; slender roundish twigs; relatively large roundish homogeneous pale pith; alternate somewhat raised small crescent-shaped leaf-scars with 3 bundle-traces; narrow stipule-scars; ovoid hairy buds with encircling linear stipules, mostly developing the first season; simple stalked serrate palmately-nerved relatively large leaves; small perfect white or bluish polypetalous flowers in dense terminal clusters; and small rounded few-seeded half-inferior capsule, the lower half of which persists as a cup.

Leaves ovate. C. americanus.
Leaves elliptical-oblong. C. ovatus.

RHAMNUS. Buckthorn.

Deciduous shrubs or small trees with rather hard usually brown wood with minute ducts diffused (in *Frangula*) or in more or less anastomosing radial patterns; rather slender roundish twigs, sometimes spine-tipped: small continuous pith; alternate or opposite transverse or half-round low leaf-scars with 3 simple or compound bundle-traces; small stipule-scars or stipules; opposite or 4-ranked scaly buds (or more or less stalked alternate naked buds in *Frangula*); simple finely toothed petioled lanceolate leaves; small greenish more or less imperfect polypetalous flowers solitary or few in the axils; and drupe- or berry-like rather small fruit with a papery envelope to each of the few seeds.

1. Buds scaly: leaves opposite or 4-ranked. 2.
   Buds naked: leaves not opposite. (Frangula). 3.
2. Branches often pungently tipped. R. cathartica.
   Unarmed. R. lanceolata.

3. Leaves glabrous, small (50 mm.), 4-ranked. R. Frangula.
Leaves puberulent beneath, longer, 5-ranked.. R. caroliniana.

PALIURUS. Jerusalem Thorn.

Deciduous shrubs or small trees with hard brownish wood; very slender zig-zag terete twigs; small roundish pith; alternate 2-ranked half-round somewhat raised minute leaf-scars with 3 usually confluent bundle-traces; small stipules some of them transformed into spines, one of each pair often straight and the other curved; small sessile ovoid buds with about 3 exposed scales; small elliptical nearly entire petioled leaves; small yellowish perfect polypetalous flowers in small axillary clusters; and rather large indehiscent hat-shaped dry winged fruit.
Leaves 3-nerved, serrulate or oblique. P. Spina-Christi.

ZIZYPHUS. Jujube.

Deciduous (or in warm countries evergreen) shrubs or small trees with firm pale wood with minute diffused ducts and very fine and close medullary rays; rather slender terete twigs; more or less angular continuous pith; alternate small crescent-shaped somewhat raised leaf-scars with 3 bundle-traces; rounded buds with several exposed scales; small rounded stipule-scars or unequal stipular spines: small axillary often clustered perfect polypetalous flowers; and rather small drupe-like fruits.
Leaves glabrous: fruit nearly sessile. Z. sativa.
Leaves woolly beneath: fruit stalked. Z. Jujuba.

Family VITACEAE. Vine Family.

A rather small family of tendril-climbers, celebrated as the source of wine and furnishing the market with grapes, raisins and dried currants: the woodbines or creepers include some of the best close-clinging climbers.

AMPELOPSIS.

Deciduous close-barked shrubs climbing by coiling tendrils or in some species nearly or quite without tendrils and bush-like, with sympodial branches with pale sub-continuous rounded

pith not diaphragmed at the nodes; alternate leaf-scars; narrow stipule-scars; small buds; simple or in one species pinnate or bipinnate scarcely fleshy leaves; small greenish perfect polypetalous flowers in forking clusters opposite the leaves; and small pale blue or purple large-seeded berries. *(Cissus).*

1. Leaves simple. 2.
   Leaves pinnate or bipinnate. (Pepper vine). A. arborea.
2. Leaves whitened beneath. A. humulifolia.
   Leaves not whitened beneath. 3.
3. Leaves serrate, little lobed: fruit scarcely showy. A. cordata.
   Leaves crenately toothed: fruit multicolored. 4.
4. Leaves deeply lobed. (Turquoise berry). A. heterophylla.
   Leaves little lobed. A. heterophylla amurensis.

PARTHENOCISSUS. Virginia Creeper. "Ampelopsis".

Woody close-barked plants climbing by coiling or more frequently disk-bearing tendrils, with soft brownish wood with rather large scattered ducts and coarse medullary rays; sympodial branches with green or pale continuous or finally chambered or excavated rounded pith not diaphragmed at the swollen nodes; alternate rounded buds with mostly 2 or 4 exposed scales; half-round or round leaf-scars with about 10 bundle-traces in a ring; elongated stipule-scars; digitate 3- or 5-foliolate thin leaves, in one species fleshier and often with 1 leaflet and so appearing simple; small greenish perfect flowers in forking clusters opposite the leaves; and small purplish large-seeded berries. *(Psedera).*

1. Tendrils long, rarely with suckers. P. vitacea.
   Tendrils with abundant suckers. 2.
2. Leaves compound, mostly of 5 leaflets. 3.
   Leaves appearing simple, or of 3 broad firm leaflets. (Boston ivy). P. tricuspidata.
3. Glabrous: leaves pale beneath: tendrils long. (Virginia creeper). P. quinquefolia.
   Pubescent: tendrils short. 4.
4. Leaves whitened beneath. P. quinquefolia Engelmannii.
   Leaves green: with aerial roots. P. quinquefolia Saint Paulii.

CISSUS. "Marine Ivy."

Woody plants climbing by coiling tendrils, with rather succulent sympodial branches with pale continuous rounded pith not diaphragmed at the nodes; alternate short buds; rounded leaf-scars; no stipule-scars; rather fleshy digitately 3-foliolate leaves; small greenish perfect polypetalous flowers in repeatedly forking clusters opposite the leaves; and small purplish large-seeded berries.

Leaves fleshy, mostly of 3 coarsely toothed leaflets. C. incisa.

VITIS. Vine. Grape.

Decidious sympodial shrubs climbing by coiling branched tendrils opposite the leaves; with typically shredding brown bark; soft brown wood with large diffused ducts and coarse medullary rays; moderate terete twigs; small rounded continuous brown pith typically with firmer plates at the nodes; alternate somewhat raised roundish or U-shaped leaf-scars with about 5 bundle-traces; long narrow stipule-scars; round-ovoid sessile buds with several exposed scales; rather large long-petioled palmately-veined or lobed leaves; perfect or unisexual polypetalous small and inconspicuous but fragrant flowers in large compound panicles opposite the leaves; and small or moderate 4- to 6-seeded berries.

1. A tendril or flower-cluster opposite each rusty-woolly leaf. (Hybrids of, and) V. Labrusca.
   No tendril or flower-cluster at each third node. 2.
2. Bark not flaking: pith not firmer at nodes. V. rotundifolia.
   Bark flaking: pith with firm plates at the nodes. 3.
3. Twigs angular, persistently gray-pubescent. V. cinerea.
   Twigs rounded, glabrate. 4.
4. Leaves woolly beneath when young. 5.
   Leaves not woolly, bright green. 6.
5. Leaves green beneath. V. aestivalis.
   Leaves whitened beneath. V. bicolor.
6. Leaves scarcely lobed. V. cordifolia
   Leaves sharply lobed. 7.

7. Climbing: leaves roundish or elongated. 8.
   Bushy: leaves rather broader than long. V. rupestris.
8. Nodal diaphragms thin: stem green. V. vulpina.
   Diaphragms thick: stem red. V. rubra.

Family TILIACEAE. Linden Family.

A rather small family furnishing the tough "bass" formerly much used for tying plants up, the very important fiber jute, and the straight-grained basswood or whitewood, and an important source of honey; much planted as shade and street-trees, especially in Europe.

TILIA. Linden, Lime, Basswood.

Deciduous trees with soft pale wood with minute scattered ducts and very fine medullary rays; moderate terete twigs with large bast-rays in the bark; round continuous pith; 2-ranked alternate half-elliptical leaf-scars with a number of scattered bundle-traces; elongated stipule-scars; ovoid sessile green or red buds with about 3 exposed scales, the terminal bud lacking; rather large oblique or cordate petioled serrate leaves; rather small white or creamy polypetalous flowers in axillary corymbs with large adherent bract; and several small hard indehiscent round fruits falling with the bracted peduncle.

1. Leaves pubescent, at least on the nerves beneath. 4.
   Leaves glabrate except in the vein-axils beneath. 2.
2. Leaves green beneath. 3.
   Leaves white beneath. T. cordata.
3. Leaves large (fully 10 cm.). T. americana.
   Leaves moderate (7 cm.). T. vulgaris.
4. Leaves green beneath: fruit typically ribbed. 5.
   Leaves whitened beneath. 8.
5. Leaves not lobed. 6.
   Leaves broad-lobed. T. platyphyllos vitifolia.
   Leaves laciniate. T. platyphyllos laciniata.
6. Tree broad-topped. 7.
   Tree rather oblong. T. platyphyllos pyramidalis.

7. Twigs gray or greenish. T. platyphyllos.
   Twigs yellow. T. platyphyllos aurea.
   Twigs red. T. platyphyllos rubra.
8. Leaves abruptly acuminate: fruit ribbed. T. tomentosa.
   Leaves gradually pointed, usually very oblique: fruit not ribbed. T. heterophylla.

Family MALVACEAE. Mallow Family.

A moderate-sized family, chiefly of herbaceous plants, noteworthy as including the most important fiber plant of the world, cotton: many species are cultivated for their flowers, and the following finds too-common use as an incongruous component of shrubberies.

HIBISCUS. Rose of Sharon. Rose Mallow.

Deciduous shrubs with pale wood with minute ducts more crowded in spring, and rather fine medullary rays connected by narrow tangential bands of wood-parenchyma; moderate somewhat angled twigs; rather large continuous pale pith; alternate somewhat raised transversely elliptical small leaf-scars with about 4 bundle-traces in an ellipse; small round stipule-scars; petioled palmately nerved and commonly lobed moderate leaves; narrow-bracted large perfect polypetalous axillary flowers with many monadelphous stamens; ovoid capsules; and curved-ciliate flat seeds.

Leaves cuneate, acutely lobed and crenately toothed. H. syriacus.

Family DILLENIACEAE.

A small unimportant family; the following used as rapid climbers, one of them, *Actinidia polygama*, a curiosity because of its attractiveness for cats.

ACTINIDIA.

Woody deciduous twiners with soft brownish wood with both large and small diffused ducts and fine medullary rays; rounded often chambered or colored pith; alternate shield-shaped raised leaf-scars with a U-shaped bundle-trace; small buds concealed in the swollen nodes; round to oblong petioled

entire or serrate rather large leaves; moderately large white solitary or few often polygamous polypetalous flowers; and small several-seeded berries.

1. Pith continuous, white. A. polygama.
   Pith chambered, colored. 2.
2. Twigs glabrous. A. arguta.
   Twigs hairy. A. chinensis.

Family TERNSTROEMIACEAE. Camellia Family

A rather small family chiefly noteworthy as including the tea plant and camellia.

STEWARTIA.

Deciduous shrubs or small trees with shredding bark; rather slender terete twigs; small brownish spongy pith; alternate somewhat raised small transverse leaf-scars; no stipule-scars; moderate or rather large petioled mucronate-serrulate leaves; large perfect solitary polypetalous flowers; and capsular fruit with few hard winged seeds.

Leaves small (3 × 6 cm.): stamens purple. S. Malachodenron.
Leaves larger (6 × 10 cm.): stamens white. S. pentagyna.

Family HYPERICACEAE. St. John's-wort Family.

A rather small family, chiefly herbs, of little use except that some are planted for their bright yellow flowers.

HYPERICUM. St. John's-wort.

Small commonly herbs or deciduous shrubs or half-shrubs with flaking bark; angular stems; small angular mostly green or brown and excavated pith; low opposite crescent-shaped or 3-angled leaf-scars with 1 bundle-trace; no stipule-scars; solitary sessile ovoid or oblong buds with a number of loose leaves; perfect entire abundantly glandular-pellucid rather small leaves; perfect showy yellow flowers in terminal corymbs, with numerous bunched stamens; and small ovoid or conical capsules.

1. Flowers large (25-50 mm.): leaves broad. H. aureum.
   Flowers smaller (scarcely 30 mm.): leaves rather narrow. 2.
2. Stems 2-angled. H. prolificum.
   Stems 4-angled. H. Kalmianum.

ASCYRUM. St. Peter's-wort.

Small deciduous shrubs or half-shrubs with flaking bark; slender 2-edged twigs; small rounded dark excavated pith; opposite low small crescent-shaped leaf-scars with 1 bundle-trace; no stipule-scars; entire pellucid-dotted nearly sessile leaves; moderate yellow nearly solitary 4-merous perfect polypetalous flowers; and 1-celled ovoid or compressed small capsules.

Leaves narrowed at base. (St. Andrew's Cross) A. hypericoides.
Leaves broad and rather clasping at base. A. stans.

Family TAMARICACEAE. Tamarisk Family.

A very small family of little use aside from landscape planting.

TAMARIX. Tamarisk. Salt Cedar.

Deciduous shrubs or small trees with reddish wood with small ducts, sometimes larger and more crowded in spring and smaller and tangentially seriate in autumn, and rather fine medullary rays; very slender terete green twigs; relatively large rounded continuous pale pith; persistent somewhat alternate raised leaf-bases; no stipule-scars; small round buds; minute scale-like acute blue-green leaves largely deciduous with the branched foliar shoots that bear them; very small polypetalous perfect rosy flowers in spike-like racemes; and small many-seeded capsules.

Petals 5. T. gallica.
Petals 4. T. parviflora.

Family CISTACEAE. Rock Rose Family.

A small and unimportant family, chiefly of herbs, some of them bright-flowered.

HUDSONIA. Beach Heather.

Low densely branched heath-like evergreen shrubs with slender roundish twigs; usually alternate scale-like long-persistent leaves; small yellow perfect flowers from the upper axils; and small 1-celled 1- or 2-seeded capsules.

Leaves spreading, rather green: flowers stalked. H. ericoides.
Leaves appressed, very gray: flowers subsessile. H. tomentosa.

Family STACHYURACEAE.

A small and unimportant family.

STACHYURUS.

Deciduous shrubs with slender rounded twigs; relatively large rather angular continuous pith; alternate somewhat raised crescent shaped leaf-scars with 3 bundle-traces; small stipule-scars; sessile round-ovoid buds with about 3 exposed scales; rather large petioled leaves; small polypetalous 4-merous rounded flowers in axillary spikes; and small berry-like fruit.

Leaves ovate or lance-ovate, serrate. S. praecox.

Family THYMELAEACEAE. Mezereon Family.

A small family of little importance apart from landscape use; one species famed in Asia for its very fragrant flowers.

DIRCA. Leatherwood.

Small deciduous shrubs with terete very tough sympodial twigs abruptly contracted at the end of each year's growth; somewhat angled homogeneous pale pith; alternate raised horse-shoe-shaped leaf-scars with about 5 bundle-traces; no stipule scars; small solitary sessile round-conical buds nearly surrounded by the leaf-scar; very short-stalked simple entire moderate leaves; rather small yellowish perfect apetalous flowers with corolla-like calyx in small clusters from the opening buds; and 1-seeded fleshy fruit.

Leaves elliptical-obovate, glabrous. D. palustris.

DAPHNE. Mezereon.

Small sometimes evergreen shrubs with tough bark; white wood with sparse diffused minute ducts and very fine medullary rays; rounded twigs; small round or 3-sided homogeneous pith; alternate low small transversely elliptical leaf-scars with 1 bundle-trace; no stipule-scars; sometimes superposed sessile small round-conic buds with several exposed scales; simple entire small subsessile leaves; small perfect apetalous flowers with corolla-like calyx, in axillary clusters; and 1-seeded fleshy fruit.

1. Evergreen. 2.
   Deciduous: bushy. D. Mezereum.
2. Branches glabrous: somewhat bushy. D. Blagayana.
   Branches pubescent: trailing. D. Cneorum.

Family ELAEAGNACEAE. Oleaster Family.

A rather small family of shrubs or small trees with pervasively rather than pleasingly fragrant flowers; sometimes prized in planting because of their silvery foliage.

SHEPHERDIA. Buffalo Berry.

Deciduous brown or silvery-scurfy shrubs or small trees often with branch-spines, with rather slender twigs; somewhat angular homogeneous pale pith; opposite low crescent-shaped small leaf-scars with 1 bundle-trace; no stipule-scars; often clustered more or less stalked buds with 1 or 2 pairs of exposed scales; entire moderate-sized short-stalked leaves; small dioecious apetalous flowers subsessile in crowded axillary clusters; and rather small drupe-like fruit. (*Lepargyraea*).

Twigs coarsely brown-scurfy: leaves elliptical, at most with stellate hairs above but silvery- and brown-scurfy and with stellate hairs beneath. S. canadensis.

Twigs and both faces of the oblong leaves with fine silvery scales. S. argentea.

ELAEAGNUS. Oleaster.

Deciduous brown- or silvery-scurfy shrubs or small trees, often with branch-spines, with rather slender twigs; somewhat angular homogeneous pale pith; alternate low crescent-shaped small leaf-scars with 1 bundle-trace; no stipule-scars; entire moderate-sized stalked leaves; solitary sessile small ovoid buds with several scales; small bell-shaped fragrant perfect stalked apetalous flowers with corolla-like calyx, in small axillary clusters; and rather small drupe like fruits.

1. Scurf silvery, even on young buds. 2.
   Scurf in part brown. 4.
2. Adult leaves with few if any scales above. 3.
   Leaves scurfy on both faces, narrow. E. angustifolia spinosa.

3. Leaves with scales beneath. (Russian Olive). E. angustifolia.
   Leaves with only star-shaped hairs. E. angustifolia orientalis.
4. Leaves glabrate and green above. E. multiflora.
   Leaves silvery on both faces. E. argentea.

HIPPOPHÄE. Sea Buckthorn.

Deciduous armed shrubs with brown wood with moderately coarse ducts, more crowded in spring and fewer and with interspersed very minute ducts in summer, and very fine medullary rays; rather slender rounded twigs commonly ending in sharp spines; round continuous brownish pith; alternate slightly raised small crescent-shaped leaf-scars with a single bundle-trace; no stipule-scars; round sessile buds with few exposed scales; narrow short-petioled leaves; small imperfect yellowish apetalous flowers in lateral clusters; and small red berry-like drupes.

Twigs rusty-scurfy: leaves silvery-scurfy below. H. rhamnoides.

Family LYTHRACEAE. Loosestrife Family.

A rather small and unimportant family, mostly of herbs, including the cigar plant and a few other species of *Cuphea* grown under glass or in bedding, and the following very attractive tree of the South.

LAGERSTROEMIA. Crape Myrtle.

Deciduous shrubs or small trees with shredding bark; pale or brownish wood with small scattered ducts, tangential wood-parenchyma pattern, and very delicate medullary rays; moderately slender twigs decurrently angled below the leaves; small brown continuous pith; alternate (or the lower opposite) small crescent shaped leaf-scars with 1 bundle-trace; no stipule-scars; appressed pointed buds with about 2 exposed scales; small obovate subsessile entire leaves; rather large perfect flowers with distinct crisped rounded long-clawed petals; and small round capsules, with winged seeds.

Flowers pink. L. indica.
Flowers purplish. L. indica violacea.
Flowers white. L. indica alba.

Family CORNACEAE. Dogwood Family.

A rather small family, chiefly of shrubs; the dogwoods much used in massed planting.

CORNUS. Dogwood. Cornel.

Deciduous shrubs, or a few undershrubs or small trees, the latter with rather hard pale or brownish wood with minute diffused ducts and fine but mostly evident medullary rays; roundish often bright-colored twigs usually compressed at the nodes; roundish homogeneous pale pith; opposite or in one case alternate low or exceptionally raised U-shaped leaf-scars connected by a transverse line, with 3 bundle traces; no stipule scars; usually solitary appressed elongated buds, often stalked or developing the first season, with 2 valvate scales; simple entire stalked exceptionally alternate or whorled leaves often whitened beneath and with very characteristic closely appressed twinned hairs; small perfect polypetalous flowers either in an involucrate head or an open corymb; and small white or red or blue inferior drupes.

1. Low undershrubs. (Bunchberries). 2.
   Shrubs or occasionally small trees. (Dogwoods). 3.
2. Leaves opposite. C. suecica.
   Leaves whorled. C. canadensis.
3. Leaves irregularly alternate. C. alternifolia.
   Leaves opposite. 4.
4. Leaves at most lighter green beneath. 5.
   Leaves whitened beneath. 8.
5. Twigs and often lower surface of leaves woolly. 6.
   Twigs and leaves not woolly. 7.
6. Lower surface silky, not granular. C. Amomum.
   Leaves hairy and granular beneath. C. obliqua.
   Leaves mostly woolly, not granular. C. sanguinea.
7. Veins incurving to the leaf-tip; flowers crowded. C. mas.
   Veins not curving into the tip: flowers in cymes. C. femina.
8. Flowers in flower-like heads: fruit red. C. florida.
   Flowers cymose: fruit white to blue. 9.
9. Leaves loosely hairy or woolly beneath. 10.
   Leaves not woolly. 12.

10. Leaves rough above: twigs rough-hairy. C. asperifolia.
    Leaves smooth above. 11.
11. Leaves rather lanceolate. C. Baileyi.
    Leaves rounded, acuminate: twigs greenish. C. rugosa.
12. Twigs rather gray. C. racemosa.
    Twigs yellow. C. stolonifera flaviramea.
    Twigs very red or purple. 13.
13. Twigs red. 14.
    Twigs purple. C. alba Kesselringii.
14. Rather erect: leaves impressed-veiny: lateral buds distinctly stalked and elongated (5-8 mm. including stalk): twigs very bright red. C. alba sibirica.
    Drooping and rooting: lateral buds nearly sessile; short (3 mm.): twigs rather purplish. C. stolonifera.

AUCUBA.

Evergreen shrubs with moderate twigs; alternate moderate glossy leaves; small dioecious 4-merous polypetalous panicled flowers; and typically red 1-seeded drupes.

1. Not variegated. A. japonica.
   Yellow-margined. A. japonica limbata.
   Yellow-mottled. 2.
2. Mottling rather uniform and fine. A. japonica variegata.
   Central yellow spot large. 3.
3. Without smaller spots. A. japonica bicolor.
   With scattered smaller spots. A. japonica latimaculata.

Family NYSSACEAE. Tupelo Family.

A very small family yielding the important tupelo-gum or black-gum lumber; the following one of the best of autumn coloring trees.

NYSSA. Tupelo.

Deciduous moderate-sized trees with pale close wood with minute diffused ducts and very close fine medullary rays; moderately slender or rather stout terete twigs; rounded continuous pith with firmer diaphragms; alternate somewhat raised broadly crescent-shaped leaf-scars with 3 bundle-traces; no

stipule-scars; rounded or ovoid sometimes superposed buds with several exposed scales; moderately large petioled leaves; sometimes imperfect small polypetalous or apetalous flowers axillary or in stalked head-like clusters; and rather small sometimes very sour blue or black inferior drupes.

Leaves glossy, entire, (Pepperidge). N. sylvatica.

Family ARALIACEAE. Aralia Family.

A rather small family of little use except for plantations. The ivy is traditionally the best climbing plant where it can endure the climate.

ACANTHOPANAX.

Deciduous shrubs or stiff sparingly branched trees with more or less prickly bark; pale soft wood with a single ring of large ducts each year and tangential wavy wood-parenchyma bands; rounded homogeneous pale pith; alternate ovoid buds with several scales; crescent shaped or linear leaf scars with 5 or more bundle-traces; digitate or palmately lobed moderate-sized leaves, often clustered on spurs; small often monoecious greenish polypetalous flowers in umbels or panicles; and small berry-like fruit crowned by the calyx-teeth.

1. Leaves simple: a tree. A. ricinifolius.
   Leaves digitately compound: shrubs.
2. Leaves green. A. pentaphyllus.
   Variegated. A. pentaphyllus variegatus.

ARALIA. Hercules' Club.

Deciduous large coarse shrubs or arborescent (herbaceous in other species), with very stout prickles; brownish zoned wood with small ducts, more crowded in the spring growth and slightly tangentially seriate later, and fine but distinct medullary rays; large crenate homogeneous pale pith; very stout terete twigs; alternate large U-shaped or linear leaf-scars half encircling the stem, with numerous bundle-traces in a single series; no stipule-scars; rounded buds with few pointed scales; very large decompound leaves; small white polypetalous perfect flowers in large showy panicles; and small inferior berries.

Leaves prickly: leaflets stalked, whitened and glabrate beneath, with upcurved veins, (Tear blanket). A. spinosa.
Leaves nearly unarmed: leaflets nearly sessile, pubescent, with straight veins, (Dimorphanthus). A chinensis.

HEDERA. Ivy.

Evergreen shrubs, climbing by aerial roots, with pale wood with minute ducts rather crowded in spring and tangentially seriate in summer, and very coarse medullary rays interspersed between the more numerous finer ones; moderate roundish twigs; rounded spongy pale pith; alternate somewhat raised U-shaped leaf-scars with 5 bundle-traces; no stipule-scars; ovoid sessile buds with several exposed scales; broadly ovate palmately lobed (or, on fruiting plants and capable of being propagated separately as a bush, lanceolate and unlobed) moderate leaves; small perfect greenish polypetalous flowers in panicled umbels; and few-seeded inferior berries.
Leaves of young plants usually 5-lobed, pale-veined. H. Helix.

Family CLETHRACEAE. Pepperbush Family.

A very small family of no considerable importance: the following rather effective in shrubberies.

CLETHRA. Pepper bush. White Alder.

Usually deciduous shrubs with flaking bark; brownish wood with minute diffused ducts and close relatively heavy medullary rays; moderate angled twigs; angled homogeneous pale pith; alternate low crescent- or shield-shaped small leaf-scars with 1 bundle-trace; small hairy buds stalked or usually developing the first season; moderately large toothed short stalked leaves; small perfect cup-shaped polypetalous flowers in elongated terminal clusters; and small rounded capsules.

1. Leaves scarcely widened upwards. C. acuminata.
   Leaves widest above the middle: stamens glabrous. 2.
2. Leaves glabrate. 3.
   Leaves persistently stellate-hairy beneath. C. tomentosa.
3. Flowers white. C. alnifolia.
   Flowers rosy. C. alnifolia rosea.

Family PYROLACEAE. Shin-leaf Family.

A small family of evergreen herbs of no economic value but sometimes effective as undershrubs and among the most attractive of the small plants of the woods.

CHIMAPHILA. Pipsissewa.

Scarcely woody evergreens with short simple erect stems; few rather lanceolate toothed moderate-sized more or less clustered firm subsessile leaves; 1 or few saucer shaped polypetalous pale flowers on a terminal stalk, rather large for the size of the plant; and depressed 5-lobed capsules.

Leaves oblanceolate, green, (Prince's pine). C. umbellata.
Leaves ovate or broadly lanceolate, white-veined. C. maculata.

MONESES. One-flowered Shin-leaf.

Small perennial low evergreen with several small crenate wing-petioled leaves clustered at end of short erect herbaceous stems; perfect white or rosy open polypetalous flowers solitary on a terminal scape; and subglobose-depressed many-seeded capsules.

Leaves round-ovate or obovate, cuneate. M. uniflora.

PYROLA. Shin-leaf.

Evergreen perennial herbs with mostly several clustered long stalked nearly entire almost basal leaves; relatively large whitish polypetalous perfect open flowers in a long-stalked raceme; and depressed small many-seeded capsules dehiscing from the base.

1. Leaves distributed on the stem, small. P. secunda.
   Leaves basal. 2.
2. Often broader than long. 3.
   Mostly longer than broad, dull. P. elliptica.
3. Small (2-3 cm.): flowers greenish. P. chlorantha.
   Large (4 cm.): glossy. 4.
4. Flowers rosy. P. asarifolia.
   Flowers white. P. americana.

Family ERICACEAE. Heath Family.

A large family, chiefly shrubs, producing the blueberries, huckleberries and cranberries of the market and the "brierwood" (bois de bruyère) of which tobacco pipes are made. The Cape heaths and Ghent azaleas are among the most popular of winter-blooming woody plants handled by florists; and the rhododendrons are among the most showy open-air shrubs.

LEDUM. Labrador Tea.

Small evergreen bog-shrubs with slender terete twigs; somewhat 3-sided brown continuous pith; alternate minute crescent shaped or 2-lobed leaf-scars with a single bundle trace; no stipule-scars; minute round sessile lateral buds and larger ovoid terminal buds with several exposed scales; elliptical-oblong leaves, revolute and rusty-tomentose beneath in the eastern species; small open perfect nearly polypetalous white flowers in short terminal clusters; and small many-seeded capsules dehiscent at the base.

Leaves subelliptical, rather broad. L. groenlandicum.
Leaves linear, narrow. L. palustre.

RHODODENDRON.

Evergreen or deciduous shrubs or small trees with hard brownish wood with minute ducts, rather more crowded in spring, and fine medullary rays; rounded slender or stout twigs; rounded or angular continuous pith; alternate crescent shaped or transverse leaf-scars with 1 bundle-trace; no stipule-scars; ovoid sometimes very large buds with a number of exposed scales; entire or ciliate lanceolate petioled leaves; perfect showy clustered mostly gamopetalous flowers; and small more or less elongated capsules. *Azalea* and *Rhodora* are considered separate genera sometimes.

1. Leaves thick, evergreen. (Rhododendron). 2.
   Leaves thin, mostly deciduous. (Azalea; Rhodora). 4.
2. Leaves tapering to apex and base: pedicels glandular. 3.
   Leaves rounded at ends: pedicels downy. R. catawbiense.

3. Flowers rosy-white, spotted. R. maximum.
   Flowers white. R. maximum album.
   Flowers purplish. R. maximum purpureum.
4. Bud-scales two to four. 5.
   Bud-scales many. 6.
5. Leaves deciduous. R. indicum.
   Leaves evergreen. B. indicum Simsii.
6. Corolla glabrous, with very short tube. 7.
   Corolla pubescent, funnel-shaped. (Azalea). 8.
7. Corolla evidently 2-lipped. (Rhodora). R. canadense.
   Corolla scarcely 2-lipped, upper lobes spotted. R. Vaseyi.
8. Corolla not glandular, yellow to flame-color. R. sinense.
   Corolla glandular-pubescent. 9.
9. Flowers white or rosy. 10.
   Flowers yellow or flame-colored. 12.
10. Twigs glabrate. R. arborescens.
    Twigs pubescent or rough-hairy. 11.
11. Buds glabrous. R. viscosum.
    Buds pubescent. R. nudiflorum.
12. Twigs glabrous or with stiff hairs. Hardy. 13.
    Twigs pubescent. Tender. R. gandavense.
13. Yellow predominating in flowers. R. calendulaceum.
    Orange predominating. R. calendulaceum croceum.

MENZIESIA.

Deciduous shrubs with shredding bark; rather soft wood with minute diffused ducts and fine medullary rays; slender subterete twigs; 3-sided brownish continuous pith; alternate somewhat raised triangular or shield shaped leaf-scars with a single bundle-trace; no stipule-scars; small round buds with several exposed scales, or the upper ovoid and larger; lance-elliptical moderately small entire short-petioled leaves clustered at end; relatively large urn-shaped gamopetalous perfect flowers loosely clustered above; and small ovoid capsules.

Leaves rough-hairy above: capsules glandular. M. pilosa.
Leaves smooth: capsules glabrate. M. glabella.

LEIOPHYLLUM. Sand Myrtle.

Small evergreen shrubs with shredding bark; slender subterete twigs; minute continuous 3-sided pith; sub-opposite minute crescent-shaped raised leaf-scars with a single bundle-trace; no stipule-scars; minute appressed pointed buds with indistinct scales; small elliptical glabrous entire leaves; small cup-shaped perfect white polypetalous flowers clustered at ends of the branches; and small many-seeded capsules dehiscent from the top.

Leaves revolute, on appressed petioles. L. buxifolium.

LOISELEURIA.

Low matted evergreen shrubs with small opposite crescent-shaped raised leaf-scars with a single bundle-trace; no stipule scars; small appressed buds with indistinct scales; small elliptical glabrous entire leaves; few small cup-shaped gamopetalous perfect white or rosy flowers with 5 stamens; and small many-seeded capsules dehiscent from the top.

Leaves revolute, on divergent petioles. L. procumbens.

KALMIA. American Laurel.

Evergreen shrubs with hard brownish wood with minute diffused pores and rather fine unequal medullary rays; somewhat angular continuous pith; moderate or slender twigs; crescent- or shield-shaped leaf-scars with a single bundle-trace; small buds with about 2 exposed scales; no stipule-scars; simple leaves rather crowded at end of the season's growth; wheel-shaped gamopetalous flowers with the anthers at first held in pockets in the corolla; and small capsules.

1. Leaves large (8-10 cm. long), alternate. K. latifolia.
   Leaves smaller (scarcely 6 cm.), opposite or whorled. 2.
2. Twigs rounded: leaves stalked. K. angustifolia.
   Twigs 2-edged: leaves nearly stalkless. K. Polifolia.

PHYLLODOCE. Mountain Heath.

Small matted evergreen shrubs with alternate raised minute crescent-shaped leaf-scars decurrent on the twigs as ridges; a single minute bundle-trace; no stipule-scars; small sessile oblong

flat leaves; small purplish gamopetalous urn-shaped slender-stalked terminal flowers; and small roundish many-seeded capsules.

Leaves minutely serrulate, obtuse. P. caerulea.

CASSIOPE.

Moss-like trailing evergreen shrubs with slender subterete twigs; more or less flattened spongy pale pith; opposite raised crescent-shaped minute leaf-scars with a single bundle-trace; no stipule-scars; minute buds usually developing the first season; small sessile overlapping leaves; rather small slender-stalked pale deeply parted cup-shaped gamopetalous flowers at end of the branches; and round-ovoid small capsules.

Leaves linear, acute, upcurved. C. hypnoides.

LEUCOTHÖE.

Evergreen or deciduous shrubs with brown wood with minute diffused ducts and fine medullary rays; slender more or less 3-sided twigs; small somewhat 3-sided continuous pith; alternate small somewhat raised crescent-shaped leaf-scars with a single bundle-trace; no stipule scars; small round buds with several exposed scales; lance-elliptical short-petioled serrulate leaves; perfect urn-shaped gamopetalous white flowers in one-sided racemes; and small depressed-globose many-seeded capsules.

1. Evergreen. 2.
   Deciduous. 3.
2. Leaves acute or short-acuminate. L. axillaris.
   Leaves long acuminate. L. Catesbaei.
3. Racemes strongly recurving. L. recurva.
   Racemes not recurved. L. racemosa.

ANDROMEDA. Bog Rosemary.

Evergreen small shrubs with rather shredding bark; few slender subterete branches; roundish brown homogeneous large-celled pith; alternate at first raised crescent-shaped small leaf-scars with 1 bundle-trace; no stipule-scars; small ovoid sessile solitary buds with 2 exposed scales; entire mostly very revolute

narrow leaves; few small pink or white perfect urceolate gamopetalous flowers in terminal umbels; and subglobose small many-seeded capsules.

Leaves glabrous: capsules brown, globose.	A. Polifolia.
Leaves white-tomentulose beneath: capsules glaucous.	A. glaucophylla.

LYONIA.

Shrubs with brown or gray smooth or fissured bark; slender 3-angled twigs; somewhat angular homogeneous pith; alternate low crescent-shaped or half-round leaf-scars with 1 bundle-trace; no stipule-scars; solitary sessile round-ovoid buds with about 2 exposed scales; small pale perfect urn-shaped gamopetalous flowers in axillary or panicled racemes; and small rounded many-seeded capsules.

Evergreen.	L. ferruginea.
Deciduous.	L. ligustrina.

PIERIS. Stagger Bush.

Evergreen or deciduous shrubs sometimes with shredding bark; rather slender roundish or 3-sided twigs; 3-sided continuous pith; alternate raised half-round small leaf-scars with a single bundle trace; no stipule-scars; sessile ovoid buds with several exposed scales; lance-elliptical entire or ciliate-serrulate short-petioled leaves; rather small white gamopetalous urceolate perfect flowers in axillary racemes or forming a terminal panicle; and small round or flask-shaped many-seeded capsules. (*Lyonia. Xolisma*).

1. Evergreen: buds compressed, acute.	2.	
Deciduous: buds blunt, with about 5 scales.		P. Mariana.
2. Twigs and petioles sparsely hairy.		P. floribunda.
Glabrous.		P. nitida.

CHAMAEDAPHNE. Cassandra. Leather Leaf.

Rather small evergreen shrubs with somewhat shredding bark; slender 3-sided twigs; minute 3-sided or flattened homogeneous pale pith; alternate low roundish margined leaf-scars with 1 bundle-trace; no stipule-scars, small rounded buds with

several ciliate scales; elliptical rather small leathery entire narrowly revolute subsessile leaves, peltate-scurfy beneath; pale perfect urceolate short-stalked gamopetalous flowers solitary in the axils of the reduced upper leaves; and depressed-globose small capsules.

1. Leaves oblong, not crisped. 2.
   Leaves linear-lanceolate, crisped. C. calyculata angustifolia.
2. Over 30 cm. high; branches rather ascending. C. calyculata.
   Scarcely 30 cm. high: branches horizontal. C. calyculata nana.

ENKIANTHUS.

Deciduous shrubs with rather slender terete twigs swollen and leafy at tip; somewhat angled brownish continuous pith; alternate crescent-shaped small little-raised leaf-scars with a single bundle-trace; no stipule scars; ovoid scaly terminal buds; moderately small obovate oblanceolate petioled entire or serrulate leaves; rather small bell- or cup-shaped gamopetalous perfect flowers in terminal racemes; and small oblong capsules erect on long slender drooping pedicels.

Flowers white: pedicels glabrous. E. perulatus.
Flowers red: pedicels loosely hairy. E. campanulatus.

OXYDENDRUM. Sourwood.

Deciduous small trees with rather soft wood with numerous small diffused ducts and fine medullary rays; rather slender rounded or 3-sided twigs; roundish continuous pale pith; alternate somewhat raised half-round leaf-scars with a single large bundle-trace; no stipule-scars; roundish buds with about 3 exposed scales; moderate petioled entire or serrulate acid leaves; perfect small urn-shaped white gamopetalous flowers, one-sided on the branches of loose terminal panicles; and small oblong many-seeded capsules erect on the pedicels.

Leaves lanceolate, acuminate. O. arboreum.

EPIGAEA. Trailing Arbutus.

Evergreen small trailing half-shrubs with rather flaking bark; moderately slender brown bristly terete twigs; roundish spongy pith; alternate moderate sized firm somewhat revolute

entire leaves on bristly stalks; more or less imperfect relatively large fragrant pinkish funnel-shaped gamopetalous flowers crowded at the ends of the shoots; and round many-seeded capsules—infrequently seen.

Leaves elliptical or ovate, often cordate. E. repens.

GAULTHERIA. Wintergreen.

Underground trailing plants with erect scarcely woody short stems few-leaved at top; or shrubs with rather 3-sided branches; alternate somewhat raised crescent-shaped or subelliptical leaf-scars with 1 bundle-trace; no stipule-scars; ovoid solitary buds with several pairs of scales; slightly revolute more or less toothed short-stalked leaves; pinkish urceolate perfect flowers in terminal racemes or axillary; and thin-walled capsules in fleshy berry-like calyx.

1. Erect stems short and simple, few-leaved. G. procumbens.
   Bushy. 2.
2. Leaves round or cordate at base: fruit blackish. G. Shallon.
   Leaves cuneate: fruit blue. G. Veitchiana.

ERICA. Heath.

Usually delicate evergreen shrubs with brown close wood with minute diffused ducts, sometimes sparser in autumn, and fine medullary rays; slender twigs with raised round leaf-scars with 1 bundle-trace; no stipule-scars; small solitary buds; small narrow spreading short-stalked leaves decurrent as raised ridges on the stem; small perfect urn-shaped mostly pinkish gamopetalous flowers crowded at the ends of the branches; and small roundish capsules with small seeds.

1. Leaves bristly, in whorls of 4. E. Tetralix.
   Leaves not bristly. 2.
2. Leaves in whorls of 4: stamens protruding. E. carnea.
   Leaves in whorls of 3: stamens not protruding. E. cinerea.

CALLUNA. Heather.

Delicate small evergreen shrubs with slender terete twigs; minute angular homogeneous pith; opposite roundish minute leaf-scars with 1 bundle-trace; no stipule-scars; very small

acutely auricled sessile entire overlapping leaves; minute rounded solitary buds with few scales, generally developing the first season; small perfect deeply parted white or reddish gamopetalous flowers along the branches in a feathery tuft, drying on the stem; and small rounded 4-celled capsules.

1. Neither matted nor prostrate. 2.
   With spreading or prostrate branches. C. vulgaris prostrata.
   Forming low dense mats. C. vulgaris nana.
2. Gray-woolly. C. vulgaris hirsuta.
   Not gray-woolly. 3.
3. Flowers white. 4.
   Flowers pink or red. 5.
4. Flowering in early autumn. C. vulgaris alba.
   Flowering very late. C. vulgaris Searlei.
5. Flowers pink or rosy. 6.
   Flowers carmine. C. vulgaris rubra.
6. Flowers single. C. vulgaris.
   Flowers double. C. vulgaris plena.

CHIOGENES. Moxie Plum.

Delicate trailing evergreen shrubs with very slender subterete twigs, minute roundish homogeneous pith; alternate low half-round or crescent-shaped minute leaf-scars with a single bundle-trace; no stipule-scars; minute flattened buds; small broad pointed subsessile leaves; small pale perfect cup-shaped gamopetalous flowers solitary in the axils; and berry-like fruit.

Stem rough: leaves glabrous above, revolute. C. hispidula.

GAYLUSSACIA. Huckleberry.

Rather small mostly deciduous shrubs with roundish slender twigs; roundish homogeneous pale pith; alternate small low crescent-shaped leaf-scars with 1 bundle-trace; no stipule-scars; solitary small sessile ovoid buds with about 3 exposed scales; simple usually entire and resinous-dotted rather small short-stalked leaves; small perfect often reddish urn-shaped gamopetalous flowers; and berry-like fruit with the seeds enclosed singly in core-like small shells.

1. Evergreen: leaves toothed: not resinous. G. brachycera.
   Deciduous: leaves entire. 2.
2. Glandular-pubescent: leaves green beneath. G. dumosa.
   Not glandular-pubescent. 3.
3. Leaves sticky-resinous, not glaucous. 4.
   Leaves pubescent and glaucous beneath. G. frondosa.
4. Fruit black, not glaucous. G. baccata.
   Fruit blue, glaucous. G. baccata glaucocarpa.
   Fruit white or pink. G. baccata leucocarpa.

ARCTOSTAPHYLOS. Bearberry. Manzanita.

Evergreen or deciduous low shrubs (as here considered) with flaking bark; rather slender and angled twigs; somewhat 3-sided homogeneous pith; alternate somewhat raised crescent-shaped leaf-scars with 1 bundle-trace; no stipule-scars; compressed ovoid small solitary buds with 2-4 exposed scales; small simple entire (in some other species toothed) short-petioled leaves; small perfect pink or white urceolate gamopetalous flowers in small racemes; and rather small red or black berries.

Trailing: leaves spatulate, glabrate. A. Uva-ursi.
Bushy: leaves ovate or elliptical, tomentose. A. tomentosa.

VACCINIUM. Blueberry.

Usually deciduous shrubs with rather hard brownish wood with minute diffused ducts and fine medullary rays; slender angled twigs; small angular continuous pith; alternate raised small crescent-shaped leaf-scars with a single bundle-trace; no stipule-scars; small ovoid buds with about 2 exposed scales; characteristically oblanceolate rather small petioled leaves; perfect open or bell-shaped gamopetalous whitish flowers; and rather small inferior berries with small seeds.—The first two species (Cranberries) are often separated, as *Oxycoccus*.

1. Evergreen: leaves small (under 2.5 cm. long). 2.
   Deciduous: fruit black or glaucous. 5.
2. Trailing slender vines: leaves very small (1 cm.): flowers open: fruit red. 3.
   Erect, more or less matted low shrubs. 4.

3. Leaves white beneath: fruit under 10 mm. V. Oxycoccos.
   Leaves less whitened: fruit over 10 mm. V. macrocarpon.
4. Leaves pointed, serrulate, fruit blackish. V. Myrsinites.
   Leaves blunt or notched, entire: fruit red. V. Vitis-Idaea.
5. Leaves blunt, small (1.5 cm.): plant low. V. uliginosum.
   Leaves acute, or else plants distinctly larger. 6.
6. Leaves glossy, narrowly revolute, veiny. V. arboreum.
   Leaves dull or else not revolute. 7.
7. Leaves small (scarcely 4 cm.): twigs granular. 8.
   Leaves larger (often 5 or 6 cm. long). 9.
8. Loosely villous. V. canadense.
   Glabrous, or crisp-pubescent in lines. V. pennsylvanicum.
9. Twigs somewhat granular or wrinkled. 10.
   Twigs not granular: leaves veiny beneath. V. stamineum.
10. Tall: rather persistently hairy. V. corymbosum.
    Dwarf: twigs and leaves glabrescent. V. vacillans.

Family DIAPENSIACEAE.

An insignificant small family. *Galax* leaves are among the autumnal commodities of florists.

DIAPENSIA.

Evergreen matted low alpine plants with small subopposite crowded sessile glabrous oblong-spatulate entire leaves; no stipules; perfect white bell-shaped gamopetalous flowers, large for the plant, solitary on slender scape-like peduncles; and ovoid leathery capsules with small seeds.

Leaves revolute, outcurved. D. lapponica.

GALAX.

Evergreen acaulescent herbs with clustered long-stalked rounded moderate glossy firm leaves bronzing in winter; small and inconspicuous perfect gamopetalous racemed flowers; and small capsules.

Leaves wavy-margined, blunt, cordate. G. aphylla.

PYXIDANTHERA. Pyxie.

Low trailing deciduous suffruticose plants with crowded or alternate small sessile entire leaves; numerous small white or

rosy open nearly sessile bell-shaped gamopetalous flowers; and small rounded many-seeded capsules.
Leaves oblanceolate, pointed. P. barbulata.

Family SAPOTACEAE. Sapodilla Family.

A chiefly tropical family members of which yield gutta percha, a number of tropical fruits, chicle, etc.: scarcely useful in planting.

BUMELIA. False Buckthorn.

Deciduous shrubs or small trees armed with axillary more or less leafy thorns; with pale hard wood with occasional small ducts along the beginning of the season's growth, very numerous minute ducts forming a coarse netted pattern in the summer wood, and very fine medullary rays; moderate roundish twigs, woolly when young; roundish homogeneous pale pith; alternate somewhat raised crescent-shaped leaf-scars with 3 bundle-traces; no stipule-scars; small ovoid sessile solitary buds with several exposed scales; simple rather oblanceolate moderate short-stalked leaves often clustered on short spurs; small perfect gamopetalous long-stalked flowers clustered on the spurs, and small 1-seeded berry-like fruit.
Leaves raised-veiny beneath, glabrous, like flowers. B. lycioides.
Leaves hairy beneath, like flowers and pedicels. B. lanuginosa.

Family EBENACEAE. Ebony Family.

A chiefly tropical family yielding ebony and other hard woods, the Japanese persimmon, etc.: scarcely of decorative use.

DIOSPYROS. Persimmon.

Deciduous shrubs or moderate-sized trees with hard brownish or blackening wood with small diffused ducts, numerous fine transverse lines of wood-parenchyma and very fine medullary rays; rather slender roundish twigs; somewhat angled spongy pith; alternate often 2-ranked somewhat raised half-round leaf-scars with 1 crescent-shaped bundle-trace; no stipule-scars; solitary sessile ovoid buds with about 3 exposed scales; rather large simple entire stalked leaves; small cup-shaped pale

axillary polygamous gamopetalous flowers; and large fleshy fruit with enlarged sepals at the base and containing several large seeds.

Loosely hairy: leaves often cordate. D. virginiana.

Family SYMPLOCACEAE.

An unimportant small family.

SYMPLOCOS. Sweet Leaf.

Deciduous or subevergreen shrubs or small trees with pale wood with minute scattered ducts and very fine medullary rays; slender or rather stout terete twigs; roundish pith with firmer diaphragms; alternate low half-round leaf-scars with a single curved bundle-trace; no stipule-scars; round superposed buds with several exposed scales; moderately small short-petioled leaves; small perfect somewhat gamopetalous yellow flowers crowded in axillary racemes; and dry mostly 1-seeded drupes.

Leaves deciduous, thin, serrate. S. paniculata.

Leaves half-evergreen, firm, entire. S. tinctoria.

Family STYRACACEAE. Storax Family.

A small and unimportant family except for the following decorative shrubs or small trees.

HALESIA. Silver Bell.

Deciduous small trees with thin shredding bark; brownish wood with minute diffused ducts and very fine medullary rays; moderate roundish twigs; roundish chambered rather small pith; alternate somewhat raised half-round leaf-scars with a single large but rather indefinite curved bundle-trace; no stipule-scars; sessile ovoid sometimes superposed buds with several exposed scales; rather large petioled leaves; perfect gamopetalous funnel- or bell-shaped rather large white flowers, slender-pedicelled at the nodes; and hard indehiscent winged fruits.

1. Fruit 4-winged. 2.
   Fruit 2-winged. H. diptera.
2. Corolla tapered at the base. H. carolina.
   Corolla bell-shaped. H. carolina Meehani.

STYRAX.

Shrubs or small trees with pale wood with small crowded vernal ducts, minute summer ducts, and very fine medullary rays; rather slender terete twigs; small rounded continuous pith; alternate small somewhat raised half-round leaf-scars with a single curved bundle-trace; no stipule-scars; ovoid appressed superposed buds with a single exposed scale; moderate short-petioled nearly entire leaves; rather small perfect bell-shaped gamopetalous flowers in leafy racemes; and dry few-seeded small fruit.

1. Leaves tomentose beneath. S. grandifolia.
   Leaves glabrate beneath. 2.
2. Pedicels for a time somewhat scurfy. S. americana.
   Pedicels glabrous. S. japonica.

Family OLEACEAE. Olive Family.

A moderate-sized family yielding the pickled olives and olive-oil of commerce, ash lumber, etc., and including a number of the most prized decorative shrubs.

FRAXINUS. Ash.

Deciduous rather large trees with hard white or brownish wood with a crowded vernal zone of moderately large ducts, fewer and smaller ducts in a more or less marked transverse wavy pattern in the summer wood, and numerous fine medullary rays; rather stout more or less compressed twigs; elliptical or 6-sided rather large pale homogeneous pith; opposite large low shield-shaped or half-round leaf-scars with many bundle-traces in a single aggregate series; no stipule-scars; sessile often superposed rounded buds with 1 or 2 exposed pairs of scales; normally odd-pinnate large stalked leaves; small mostly imperfect and apetalous flowers in lateral clusters; and winged fruits.

1. Twigs acutely 4-angled, or 4-winged: buds gray:
   fruit broad, winged all around. F. quadrangulata.
   Twigs not acutely angled. 2.

2. Buds blue-black: leaflets sessile: fruit broad, winged all around. (European ash). 3.
   Buds brown: leaflets stalked: fruit narrow, winged principally at the end. 11.
3. Leaves of a single leaflet. F. excelsior monophylla.
   Leaves pinnate. 4.
4. Leaflets deeply cut. F. excelsior asplenifolia.
   Leaflets not deeply cut. 5.
5. Dwarf and shrubby. F. excelsior nana.
   Trees. 6.
6. Weeping. 7.
   Not weeping. 8.
7. Twigs gray. F. excelsior pendula.
   Twigs yellow. F. excelsior aurea pendula.
8. Twigs yellow. F. excelsior aurea.
   Twigs gray. 9.
9. Leaves green. F. excelsior.
   Leaves variegated. 10.
10. Leaves with white center. F. excelsior albo-variegata.
    Leaves with white margin. F. excelsior albo-marginata.
11. Leaves whitened beneath: fruit rather stout, scarcely wing-margined: leaf-scars concave at top. 12.
    Leaves merely lighter green beneath: fruit slender, the narrow wing continuing to the base: scar-margin not concave. 14.
12. Glabrous. 13.
    More or less velvety. F. americana Biltmoreana.
13. Leaves uniformly green above. (White ash). F. americana.
    Leaves white-margined. F. americana albo-marginata.
14. Glabrous or nearly so. (Green ash). F. lanceolata.
    Twigs velvety. (Red ash). F. pennsylvanica.

FONTANESIA.

Deciduous shrubs with slender 4-angled twigs; round homogeneous pale pith; opposite or obliquely opposite raised small crescent-shaped leaf-scars with 1 bundle-trace; no stipule-scars;

alternate round-ovoid solitary sessile buds usually with 2 or 3 pairs of exposed scales; simple glossy moderately small short-stalked leaves; small whitish perfect flowers clustered at the ends of the branches; and rather small winged hard fruits.

Leaves quite entire. F. Fortunei.
Leaves rough margined or minutely toothed. F. phillyraeoides.

FORSYTHIA. Golden Bell.

Deciduous shrubs with moderately slender elongated sometimes scrambling or rooting branches, often green until autumn; with roundish excavated or chambered pale pith; opposite or occasionally whorled somewhat spreading narrowly ovoid buds, superposed and generally branching collaterally so as to form axillary clusters in autumn, with several exposed scales; rather raised small crescent-shaped leaf-scars with 1 bundle-trace; lanceolate to ovate slightly fleshy mostly serrate leaves, simple or in the broader forms digitately 3-lobed or 3-foliolate; showy yellow short-tubed perfect gamopetalous flowers in axillary clusters; and small 2-celled capsules with winged seeds.

1. Leaves elongated: pith chambered. 2.
   Leaves broad, often 3-lobed or 3-foliolate, toothed. 4.
2. Leaves neither lobed nor divided, entire below. 3.
   Leaves in part lobed or divided, on shoots. × F. intermedia.
3. Leaves green. F. viridissima.
   Leaves variegated with white. F. viridissima variegata.
4. Essentially glabrous. 5.
   Leaves downy, at least beneath. F. suspensa pubescens.
5. Bushy or spreading. 6.
   Scrambling, or spreading and drooping. F. suspensa.
6. Shoots rather stout and upright. 7.
   Shoots slender, rooting at the end. F. suspensa Sieboldii.
7. Leaves rarely of 3 leaflets: pith for a time chambered near the nodes. × F. intermedia.
   Leaves frequently 3-foliolate: pith entirely excavated except at the nodes. 8.
8. Shoots and foliage green. 9.
   Shoots and young foliage purplish. F. suspensa atrocaulis.

9. Leaves green: growth rather erect. F. suspensa Fortunei.
Leaves variegated with yellow. F. suspensa variegata.

SYRINGA. Lilac.

Deciduous shrubs with pale wood with small ducts, somewhat larger and more crowded in spring, and fine but distinct medullary rays; round twigs somewhat compressed or fluted beneath the nodes or rather 4-angled; roundish continuous pith; opposite crescent-shaped somewhat raised leaf-scars with a transverse compound bundle-trace; ovoid sessile buds, the terminal usually wanting, with several pairs of scales; rather ovate petioled leaves, entire or pinnately lobed or dissected; small salver- or funnel-shaped perfect gamopetalous flowers in ample panicles; and 2-valved oblong flattened few-seeded capsules.

1. Leaves rough-margined, whitened beneath, buds large, with brown scales: twigs warty. S. villosa.
Leaves scarcely rough-margined. 2.
2. Leaves pale beneath: calyx white. S. amurensis.
Leaves green beneath. 3.
3. Leaves cordate: buds round-ovoid, green. S. vulgaris.
Leaves acute at base: buds pointed, brown. 4.
4. Leaves not lobed. S. persica.
Leaves, in part, pinnately lobed. S. persica laciniata.

FORESTIERA. Swamp Privet.

Deciduous shrubs or small trees with rather hard white wood with minute diffused ducts and very fine medullary rays; more or less 4-sided often pungent twigs; roundish homogeneous pith; opposite somewhat raised small transversely elliptical or lens-shaped leaf-scars with 1 rather large bundle-trace; no stipule-scars; superposed rounded sessile buds with 2 or 3 pairs of exposed scales; simple stalked rather low-toothed leaves often clustered on spurs; small imperfect yellowish flowers in nearly sessile lateral clusters; and rather small drupes pointed at both ends. *(Adelia).*

Twigs glabrous. F. acuminata.
Twigs pubescent. F. ligustrina.

CHIONANTHUS. Fringe Tree.

Large shrubs with white wood with about 1 ring of small vernal ducts, broad radial or flame-shaped wood-parenchyma pattern in summer, and very fine medullary rays; more or less 4-sided or 4-lined rather stout warty twigs; compressed or angled homogeneous pale pith; opposite raised and often decurrent crescent-shaped leaf-scars with a crescent-shaped aggregate bundle-trace; no stipule-scars; round-ovoid solitary sessile buds with a number of pungently pointed exposed scales; simple rather large petioled entire leaves; perfect or polygamous 4-merous flowers with long white nearly separate corolla lobes, in more or less leafy axillary clusters; and purple drupes.

Leaves acuminate, glabrate. C. virginica.
Leaves not acuminate: petioles hairy. C. retusa.

OSMANTHUS. Fragrant Olive.

Evergreen shrubs or small trees with pinkish close wood with few uniform minute ducts in a flame-like pattern and very fine medullary rays; rather slender somewhat compressed twigs; roundish continuous pith; opposite rather small shield-shaped slightly raised leaf-scars with a crescent-shaped compound bundle-trace; no stipule-scars; spreading ovoid or conical sessile buds, sometimes superposed, with 2 exposed scales; rather large leathery lanceolate petioled leaves; small sometimes imperfect openly conical gamopetalous white flowers in small axillary panicles; and small 1-seeded drupes.

Leaves pointed at both ends and entire. O. americanus.
Leaves blunt at base, serrulate: petiole channeled. O. fragrans.

LIGUSTRUM. Privet.

Deciduous or half-evergreen shrubs with pale or smoky wood with small diffused ducts and fine medullary rays; rather slender roundish or compressed twigs; roundish homogeneous pale pith; somewhat raised opposite roundish or transversely elliptical leaf-scars with one compound bundle-trace; no stipule-scars; solitary sessile ovoid buds with about 2 pairs of exposed scales; simple entire very short-stalked moderately small leaves;

perfect small white shortly salver-shaped gamopetalous flowers in terminal panicles; and berry-like usually black fruit.

1. Leaves glabrate: fruit glossy, rather large (8 mm.) in clusters protruding beyond the branches. 2.
   Leaves often pubescent beneath, at least on the midrib: fruit dull, rather small (5 mm.), in small clusters surpassed by the shoots. 3.
2. Twigs glabrous: fruit round. L. ovalifolium.
   Twigs puberulent: fruit rather ovoid. L. vulgare.
3. Habit erect: calyx glabrate. L. amurense.
   Habit spreading: calyx usually puberulent. 4.
4. Tall, with curving branches. L. Ibota.
   Dwarf, with horizontal branches. L. Ibota Regelianum.

JASMINUM. Jessamine.

Shrubs, sometimes scrambling, with white wood with small ducts crowded in spring but sparser and much smaller in summer, and fine medullary rays; slender mostly angled twigs; round chambered pith; opposite or alternate but 4-ranked somewhat raised small crescent-shaped leaf-scars with a single bundle-trace; no stipule-scars; round or ovoid or spindle-shaped sessile buds; odd-pinnate or by reduction apparently simple petioled leaves; fragrant salver-shaped gamopetalous perfect flowers in axillary clusters; and 2-seeded berries.

1. Leaves evidently compound. 2.
   Leaves 1-foliolate, appearing simple. J. pubescens.
2. Leaves opposite. 3.
   Leaves alternate. J. humile.
3. Flowers white. 4.
   Flowers yellow. J. nudiflorum.
4. Bushy. J. grandiflorum.
   Scrambling. J. officinale.

Family LOGANIACEAE. Strychnine Family.

A moderate chiefly tropical family, mainly notable as affording the poison strychnine: the following attractive climber medicinal.

GELSEMIUM. Carolina Jessamine.

Evergreen twining woody plants with slender twigs somewhat square at the nodes; roundish continuous white pith; opposite elevated crescent-shaped or half-round leaf-scars with a large bundle-trace; small stipule-scars; sessile buds with several pairs of pointed scales; rather small short-petioled entire leaves; openly funnel-shaped rather large fragrant yellow gamopetalous perfect flowers solitary on short scaly axillary shoots; moderate thin-walled capsules; and relatively large winged seeds.

Leaves lanceolate, very acute. G. sempervirens.

BUDDLEIA.

Deciduous half-shrubs with soft wood with minute diffused ducts and fine medullary rays; slender squarish twigs; 4-sided homogeneous pale pith; opposite low half-round or triangular leaf-scars with 1 bundle-trace; narrow stipule-scars; sessile ovoid acute somewhat spreading superposed buds with usually 2 exposed scales; simple toothed short-stalked moderate leaves; small mostly lavender perfect funnel-shaped gamopetalous flowers in clusters ending the branches; and small ovoid capsules with minute seeds.

1. Branches rather erect. 2.
   Branches spreading or drooping. 3.
2. Flower clusters straight. B. Lindleyana.
   Flower clusters drooping. × B. intermedia insignis.
3. Leaves white- or yellow-tomentose beneath. B. Davidii.
   Leaves glabrate or finely gray-tomentose. 4.
4. Flowers lilac, in clusters scarcely 20 cm. long. B. japonica.
   Flowers violet, in longer clusters (25-30 cm.). × B. intermedia.

Family APOCYNACEAE. Dogbane Family.

A moderate widespread family, members of which yield African India rubber: one *Vinca* is largely used in bedding and another for window-boxes.

VINCA. Periwinkle.

Evergreen trailing herbs with opposite petioled rather small leaves; rather large perfect funnel- or salver-shaped stalked

gamopetalous flowers; and paired cylindrical follicles which are infrequently seen.

Leaves lanceolate: flowers blue. (Running "myrtle"). V. minor.

Family ASCLEPIADACEAE. Milkweed Family.

A moderate-sized family, chiefly of herbs with milky sap, some of which are used in hardy perennial planting. *Hoya*, the waxflower, and *Stapelia*, the star-"cactus", are frequent in greenhouses.

PERIPLOCA. Silk Vine.

Deciduous twining woody plants with milky sap; round stems; opposite raised round leaf-scars with a single curved bundle-trace; no stipule-scars; small hairy buds with few scales; moderate entire petioled leaves; rather large perfect purplish gamopetalous flowers in sparse stalked axillary clusters; slender paired follicles; and small winged seeds.

Leaves ovate, round-based, acuminate. P. graeca.

Leaves lanceolate. P. graeca angustifolia.

Family POLEMONIACEAE. Phlox Family.

A rather small family of herbs, much used as hardy perennials.

PHLOX.

Mostly perennial herbs with opposite leaves; gamopetalous salver-shaped white or reddish perfect flowers in sometimes panicled cymes; and small 2-seeded capsules. The following somewhat woody evergreen matted species with small linear leaves is used for rockeries, etc.

Flowers bluish or pink. (Ground pink). P. subulata.

Flowers white. P. subulata alba.

Family VERBENACEAE. Verbena Family.

A moderately small family, chiefly of woody species in the tropics, yielding the teak lumber used in ship-building. Among bedding plants *Verbena* and *Lantana* are familiar examples—the latter a bad weed in Hawaii, and one *Clerodendron* is a very effective greenhouse climber.

CLERODENDRON.

Deciduous half-woody plants with rather stout terete or compressed twigs; large round or squarish continuous white pith; opposite somewhat raised subelliptical leaf-scars, sometimes in whorls of 3, with about 10 small bundle-traces in a single U-shaped group; no stipule-scars; conical superposed sessile buds; rather large ovate long-petioled often serrate leaves; perfect salver-shaped flowers in clustered axillary corymbs with showy calyx and gamopetalous corolla; and drupe-like fruit.

Leaves acuminate: corolla white. C. trichotomum.

CARYOPTERIS.

Deciduous small shrubs with slender rounded twigs; rounded homogeneous pale pith; opposite low crescent-shaped or half-round small leaf-scars with 1 transverse bundle-trace; no stipule-scars; small ovoid sessile solitary buds with about 4 exposed scales; petioled coarsely toothed leaves; small funnel-shaped perfect gamopetalous flowers in dense stalked axillary clusters; and small dry fruit of 4 nutlets.

Flowers lavender to violet. C. incana.

Flowers white. C. incana candida.

CALLICARPA. French Mulberry.

Deciduous small shrubs or half-shrubs with slender nearly terete twigs; rounded homogeneous pale pith; opposite low crescent-shaped leaf-scars with 1 bundle-trace; no stipule-scars; oblong acute sessile superposed somewhat spreading naked buds; simple toothed or lobed very short-stalked leaves; small usually pink salver-shaped gamopetalous flowers in dense short-stalked axillary clusters; and small often purplish berry-like drupes with 2-4 seed-like kernels.

1. Leaves woolly beneath. 2.
   Leaves not woolly. 3.
2. Fruit violet. C. americana.
   Fruit white. C. americana alba.
3. Leaves rather coarse-toothed. C. purpurea.
   Leaves serrulate. 4.

4. Fruit violet. C. japonica.
Fruit white. C. japonica leucocarpa.

VITEX. Chaste Tree.

Deciduous shrubs or half-shrubs with soft brown wood with small ducts, large and crowded in spring but decreasing and diffused in summer, and fine medullary rays; rather slender 4-sided or 4-lined twigs; relatively large continuous white pith; opposite low crescent-shaped small leaf-scars with a single curved bundle-trace; no stipule-scars; rounded sessile superposed tomentose buds with indistinct scales; digitate slender-petioled leaves; rather small perfect typically tubular gamopetalous flowers crowded in the axils; and small 4-celled drupe-like or finally dry peppery-aromatic fruits.

1. Leaflets entire or low-serrate. 2.
Leaflets deeply pinnatifid. V. Negundo incisa.
2. Flowers lavender. V. Agnus-Castus.
Flowers blue. V. Agnus-Castus caerulea.
Flowers white. V. Agnus-Castus alba.

Family SOLANACEAE. Potato Family.

A large widespread family, chiefly of herbs, containing such important species as potato, tomato, egg-plant, capsicum, tobacco, nightshade and henbane. *Schizanthus*, *Petunia*, etc., are much grown for their flowers.

LYCIUM. Matrimony Vine.

Deciduous spreading or scrambling shrubs with pale bark; slender often spiny angled twigs; somewhat 3-sided continuous pale pith; alternate raised crescent-shaped leaf scars with 1 bundle-trace; no stipule-scars; more or less multiple sessile buds with few exposed scales; simple moderately small lanceolate entire cuneately subsessile leaves; moderate shortly funnel form perfect gamopetalous axillary flowers; and orange berries.

Leaves gray green: fruit above 10 mm. long. L. halimifolium.
Leaves bright green: fruit 20 mm. long. L. chinense.

SOLANUM.

Usually herbs, (potato, egg plant, etc.); the following (bittersweet) a soft-wooded perennial twining climber with alternate leaves; wheel-shaped perfect violet flowers in stalked clusters from above the axils; and ovoid red berries.

Leaves cordate or hastately lobed or divided. S. Dulcamara.

Family SCROPHULARIACEAE. Figwort Family.

A large family, chiefly herbaceous, including foxglove, snap dragon, etc., of the gardens, and such common weeds as mullein and speedwell. The following is a street tree as far north as Brooklyn.

PAULOWNIA.

Deciduous medium-sized trees with rather soft brownish wood with small ducts, more or less crowded in spring and tangentially seriate in summer, and fine medullary rays; stout roundish twigs flattened at the nodes; roundish large pith, chambered, or excavated between the nodes; opposite somewhat raised large subelliptical leaf-scars with numerous bundle-traces in a single series; no stipule-scars; rounded mostly superposed buds with several exposed scales; large ovate petioled leaves; violet gamopetalous 2-lipped large flowers in terminal panicles; and ovoid capsules with winged seeds.

Leaves cordate, pubescent. (Imperial tree). P. tomentosa.

Family BIGNONIACEAE. Bignonia Family.

A rather small warm-region family including many woody climbers, frequent in conservatories, and some trees; occasionally yielding valuable timber, such as primavera.

BIGNONIA. Cross Vine.

More or less evergreen woody plants, climbing by leaf tendrils; with brownish soft wood with large crowded ducts in spring, minute scattered ducts in autumn, and unequal medullary rays of which 4, consisting of brown bast, may be conspicuous in the form of a cross; rather slender twigs square or somewhat flattened at the nodes; rounded mostly excavated pith; opposite half-round somewhat raised leaf-scars with 1 bundle-trace; no stipule-

scars; ovoid sessile not superposed buds with several pairs of loose scales; compound leaves with terminal tendrils; large perfect gamopetalous flowers; and large flattened capsules with winged seeds.

1. Tendrils ending in disks. 2.
   Tendrils claw-like, without disks. B. Unguis-cati.
2. Flowers reddish. B. capreolata.
   Flowers purplish. B. capreolata atrosanguinea.

CAMPSIS. Trumpet Creeper.

Deciduous woody plants, climbing by aerial roots, with moderate roundish twigs; round continuous or evanescent pith; opposite somewhat raised half-round or round leaf-scars with a U-shaped compound bundle-trace; no stipule-scars; ovoid sessile buds with several pairs of scales; odd-pinnate leaves with toothed leaflets; large perfect trumpet-shaped gamopetalous flowers; and compressed pods with numerous winged seeds. (*Tecoma*).

1. Shrubby. C. radicans speciosa.
   Climbing. 3.
2. Flowers orange-red. C. radicans.
   Flowers scarlet. C. radicans atropurpurea.

CATALPA. Indian Bean.

Small or medium-sized trees with rough gray bark; brown rather soft but durable wood with moderately large ducts slightly more crowded in the spring growth and in more or less evident transverse lines later in the season, and fine medullary rays; stout roundish twigs; large round homogeneous pale pith; large elliptical more or less raised or cup-shaped leaf-scars usually in whorls of 3 of which in successive whorls two are regularly larger and smaller, with numerous bundle-traces confluent in an ellipse; no stipule-scars; rather small rounded solitary sessile buds with several exposed scales, the terminal bud wanting; simple long-stalked large ovate often cordate entire or angled rather than lobed leaves; large spotted whitish funnel-shaped perfect gamopetalous flowers; and long cylindrical 2-valved capsules with flat seeds long-ciliate from the ends.

1. Flowers and fruit in racemes. C. Bungei.
   Flowers and fruit in panicles. 2.
2. Pods about 5 mm. in diameter: leaves mostly angled: twigs hairy. 3.
   Pods about 8 mm. in diameter: seeds pointed: leaves rarely angled: twigs glabrous. 5.
   Pods fully 10 mm. in diameter: seeds obliquely truncate: leaves often angled. (Warder's catalpa). C. speciosa.
3. Mature leaves glabrous. (Japanese catalpa). C. ovata.
   Mature leaves pubescent. (Teas' catalpa). 4.
4. Leaves green. × C. hybrida.
   Leaves purple while young. × C. hybrida purpurea.
5. Tree. (Common catalpa). 6.
   Shrub, or usually grafted as a standard. C. bignonioides nana.
6. Leaves green. C. bignonioides.
   Leaves yellow. C. bignonioides aurea.

CHILOPSIS. Desert Willow.

Deciduous shrubs or small trees with soft dark brown wood with diffused rather large ducts and fine but evident pale medullary rays; slender somewhat angled twigs; small angled pale homogeneous pith; whorled or opposite or even scattered raised crescent-shaped small leaf-scars with a single bundle-trace; no stipule scars; small compressed roundish buds with 2 nearly valvate outer scales; simple subsessile willow-like leaves; rather large trumpet-shaped perfect gamopetalous flowers in terminal racemes; and long slender cylindrical 2-valved capsules and thin winged seeds, long-ciliate especially at the ends.

Leaves linear to narrowly lanceolate, entire. C. saligna.

Family RUBIACEAE. Coffee Family.

A large heterogeneous family, largely of the tropics, yielding coffee, quinine, ipecac, etc. Bouvardias are among the useful bright-flowered species grown under glass.

CEPHALANTHUS. Button Bush.

Deciduous shrubs with moderately slender roundish twigs; rather 4-sided homogeneous pale brown pith; low half-round

small leaf-scars with a single crescent-shaped bundle-trace, opposite or in whorls of 3 with a narrow connecting stipular line; small often superposed buds nearly concealed in the bark, the terminal wanting; simple rather large and long-stalked entire leaves; small funnel-shaped perfect gamopetalous white flowers in dense long-stalked terminal and axillary heads; and similar aggregates of inversely pyramidal small hard fruits.

Leaves broad, elliptical-ovate. C. occidentalis.
Leaves oblong-lanceolate. C. occidentalis angustifolia.

GARDENIA. Cape Jessamine.

Evergreen shrubs with pale or brownish wood with minute diffused ducts and very fine medullary rays; moderate square twigs; somewhat angled continuous pith; opposite slightly raised half-round leaf-scars, connected by transverse stipule-scars; sessile stipule-sheathed pointed buds; moderate cuneate-obovate entire leaves; and large solitary perfect funnel-shaped gamopetalous fragrant white flowers, with 1-celled ovary,—the calyx tubular, not ribbed and with long teeth in the following.

Flowers single. C. jasminoides.
Flowers double. C. jasminoides plena.

MITCHELLA. Partridge Berry.

Small evergreen nearly herbaceous trailing plants with small opposite petioled leaves with intervening connate stipules; tubular funnel-shaped or salver-shaped rather small perfect flowers paired at end of slender axillary stalk; and rather small red twinned inferior berries with a few large seeds.

Leaves round-ovate, very obtuse, glabrous. M. repens.

Family CAPRIFOLIACEAE. Honeysuckle Family.

A moderate sized family of no great use apart from gardening, but containing some of the most used and most prized plant materials of the landscape gardener.

SAMBUCUS. Elder.

Deciduous shrubs or straggling small trees with soft pale wood with minute ducts, diffused or in a somewhat evident tan-

gential pattern, and rather fine medullary rays; stout terete twigs often with large lenticels; large continuous rounded pith; opposite rather large somewhat crescent-shaped leaf-scars with 3-5 bundle-traces; no stipule-scars; ovoid often superposed or collaterally multiplied buds with several pairs of scales; pinnate leaves with toothed or sometimes incised leaflets; small perfect gamopetalous wheel-shaped white flowers in large showy clusters; and small normally black or red inferior 3-seeded berries.

1. Pith brown: fruit red. 2.
   Pith white: fruit typically black. 6.
2. Petioles downy. (American red-berried elder). S. pubens.
   Petioles glabrous. (European red-berried elder). 3.
3. Leaves green. 4.
   Leaves yellow. 5.
4. Leaves not laciniate. S. racemosa.
   Leaves laciniate. S. racemosa plumosa.
5. Leaves not laciniate. S. racemosa aurea.
   Leaves laciniate. S. racemosa plumosa aurea.
6. Leaves rather firm: fruit small (3 mm.) European. 7.
   Leaves rather thin: fruit larger (4-5 mm.). American. 10.
7. Leaves green. 8.
   Leaves partly or wholly yellow or white. 9.
8. Leaves not laciniate. S. nigra.
   Leaves laciniate. S. nigra laciniata.
9. Leaves whitish. S. nigra argentea.
   Leaves entirely yellow. S. nigra aurea.
   Leaves variegated with yellow. S. nigra variegata.
10. Leaves green. 11.
    Leaves yellow or variegated. 14.
11. Leaves not laciniate. 12.
    Leaves laciniate. S. canadensis laciniata.
12. Leaves glabrescent. 13.
    Leaves soft-pubescent. S. canadensis submollis.
13. Fruit nearly black. S. canadensis.
    Fruit greenish. S. canadensis chlorocarpa.
14. Leaves solidly yellow. S. canadensis aurea.
    Leaves with yellowish variegation. S. canadensis variegata.

VIBURNUM. Arrow Wood.

Usually deciduous shrubs or small trees with pale or brown wood with minute ducts and very fine medullary rays; slender or moderately stout terete or 6-sided twigs with continuous pith of corresponding shape; opposite somewhat raised crescent-shaped leaf-scars with 3 bundle-traces; no stipule-scars; oblong more or less stalked appressed buds with 2 valvate or connate exposed scales (naked in one group); lanceolate to ovate entire or toothed or lobed petioled leaves; small perfect wheel-shaped gamopetalous 5-merous white flowers (sometimes larger and neutral in the margin or throughout,) in terminal corymbs; and rather small often flattened inferior drupes.

1. Buds naked: young growth very stellate-scurfy. 2.
   Buds scaly. 4.
2. Flowers salver-shaped, early, fragrant. V. Carlesii.
   Flowers wheel-shaped, later. 3.
3. Leaves very large, thin, cross-veined beneath. V. alnifolium.
   Leaves moderate (scarcely 8×10 cm.), firmer. V. Lantana.
4. Leaves pinnately veined, not lobed. 5.
   Leaves palmately veined and often lobed. 15.
5. Very stellate-pubescent: leaves impressed-veiny. 6.
   Neither very pubescent nor impressed-veiny. 8.
6. Some of the flowers fertile. 7.
   All of the flowers showy and sterile. V. tomentosum plenum.
7. Leaves elliptical-ovate. V. tomentosum.
   Leaves lanceolate. V. tomentosum lanceolatum.
8. Veins distinct to the coarsely toothed margin. 9.
   Veins looping or vanishing short of the margin. 11.
9. Leaves glabrate: petiole rather long: no stipules. V. dentatum.
   Leaves rather persistently pubescent beneath, with stipules. 10.
10. Stipules much shorter than the petiole. V. molle.
    Stipules longer than the very short petiole. V. pubescens.
11. Leaves entire, revolute, dotted beneath. V. nudum.
    Leaves more or less finely toothed. 12.
12. Leaves dotted beneath. V. cassinoides.
    Leaves not dotted. 13.

13. Buds, petioles etc. very red-scurfy. V. rufidulum.
    Buds etc. rather gray-brown, glabrescent. 14.
14. Leaves small (about 4×6 cm.), scarcely taper-pointed: twigs often stiff and spreading. V. prunifolium.
    Leaves larger (about 5×8 cm.), acuminate. V. Lentago.
15. Petiole without nectar-glands. 16.
    Several nectar-glands on petiole. 17.
16. Pubescent: glandless: with stipules. V. acerifolium.
    Glabrate: lower teeth glandular: no stipules. V. pauciflorum.
17. Glands large (about 1 mm. in diameter). 18.
    Glands small (about .5 mm.). V. americanum.
18. Some flowers fertile. 19.
    Flowers all showy and sterile. (Snowball). V. Opulus.
19. Dwarf. V. Opulus nanum.
    Tall shrubs. 20.
20. Sterile flowers large (25 mm.). V. Sargentii.
    Sterile flowers rather small (15-20 mm.). 21.
21. Fruit red. V. Opulus.
    Fruit yellow. V. Opulus xanthocarpum.

SYMPHORICARPOS.

Deciduous small shrubs with slender terete twigs; small rounded continuous or evanescent pith; opposite somewhat raised crescent-shaped leaf-scars with a single bundle-trace; no stipule scars; ovoid buds with about 2 pairs of exposed scales; simple entire or exceptionally lobed ovate petioled leaves; small white or rosy bell-shaped perfect gamopetalous flowers, hairy within; and white or red inferior berries.

1. Pith continuous: leaves small (scarcely 40 mm.), white beneath: fruit red. 2.
   Pith excavated: leaves larger: fruit white. (Snowberry). 3.
2. Leaves unvariegated. (Coral berry). S. orbiculatus.
   Leaves variegated. S. orbiculatus variegatus.
3. Leaves often deeply lobed, glabrate: fruit late. × S. Heyeri.
   Leaves very rarely a little lobed. 4.

4. Flowers and fruit in continuous spikes: stamens protruding. (Wolfberry). S. occidentalis.
   Flowers in interrupted spikes: stamens not protruding. 5.
5. Leaves hairy beneath. (Snowberry). 6.
   Leaves glabrous. S. albus laevigatus.
6. Leaves not whitened beneath. S. albus.
   Leaves whitened beneath. S. albus pauciflorus.

LINNAEA. Twin Flower.

Delicate evergreen woody trailing plants with frequent short erect branches bearing few small opposite stalked crenate leaves; small funnel-shaped perfect gamopetalous fragrant white and rosy flowers usually paired at the end of a slender terminal peduncle; and small 1-seeded capsules.

Basal tube of corolla shorter than calyx. L. borealis.
Slender corolla tube longer than calyx. L. borealis americana.

ABELIA.

Deciduous or partly evergreen shrubs with slender more or less square twigs with excavated pith; opposite low U-shaped leaf-scars, connected by a cross line, with 3 bundle-traces; small somewhat spreading solitary ovoid sessile buds with several pairs of loose scales, often developing into branches the first season; small ovate slightly toothed subsessile leaves: perfect funnel-shaped gamopetalous flowers in axillary or terminal leafy clusters; and small dry inferior berries.

1. Flowers in terminal panicles. 2.
   Flowers in small lateral clusters: leaves deciduous. 3.
2. Leaves half-evergreen: flowers 20 mm. long. × A. grandiflora.
   Leaves deciduous: flowers 15 mm. long. A. chinensis.
3. Flowers 15 mm. long. A. Engleriana.
   Flowers 25 mm. long. A. Graebneriana.

LONICERA. Honeysuckle.

Deciduous or partly evergreen shrubs or woody twiners with white or yellowish brown wood with small ducts, those of the

spring sometimes more crowded or somewhat larger, and fine medullary rays; rather slender round or squarish twigs; more or less angled sometimes evanescent pith; somewhat raised opposite crescent-shaped or 3-angled leaf-scars with 3 bundle-traces; no stipule-scars; ovoid or conical sessile buds often superposed and the lowermost then largest; simple entire short-stalked or sessile moderate leaves; perfect tubular moderate-sized sometimes very fragrant flowers often in axillary pairs; and berry-like fruit.

1. Bushy. 2.
   Twining or trailing. 6.
2. Pith continuous: no end-bud: flowering before leaves. 3.
   Pith excavated. 4.
3. Twigs retrorsely bristly. L. Standishii.
   Twigs glabrate. L. fragrantissima.
4. Twigs glabrate. L. tatarica.
   Twigs pubescent. 5.
5. Lower surface of leaves short-pubescent. L. Xylosteum.
   Leaves with rather long hairs beneath. L. Morrowii.
6. Upper leaves joined in pairs. 7.
   Leaves not united by their bases. 9.
7. Corolla nearly regular, with short lobes: partly evergreen. 8.
   Corolla deeply 2-lipped. L. Caprifolium.
8. Flowers bright red. L. sempervirens.
   Flowers bright yellow. L. sempervirens flava.
9. Very glaucous. L. Periclymenum.
   Little if at all glaucous. 10.
10. Leaves not variegated. 11.
    Leaves golden-veined. L. japonica aureo-reticulata.
11. Flowering in summer. L. japonica.
    Flowering in autumn. L. japonica Halliana.

DIERVILLA. Bush Honeysuckle.

Deciduous shrubs with rather stout twigs with 2 or 3 often hairy longitudinal lines; roundish homogeneous pale pith; rather low triangular leaf-scars, opposite or in whorls of 3, with 3-bundle-traces and with transverse or decurrent lines from their angles; no stipule-scars; oblong mostly appressed solitary sessile

buds with several pairs of rather loose pointed scales; simple short-stalked toothed leaves; moderate or rather large perfect funnel-shaped gamopetalous flowers in axillary clusters; and narrow inferior capsules with small seeds.

1. Flowers small (scarcely 15 mm. long), yellow. (Diervilla). 2. Flowers distinctly larger, white to deep red. (Weigelia). 3.
2. Twigs rounded: leaves distinctly petioled. D. Lonicera.
   Twigs 4-angled: leaves nearly sessile. D. sessilifolia.
3. Calyx-tube nearly as long as the lobes. D. florida.
   Sepals narrow, parted to the base.
   D. japonica, floribunda, and × D. hybrida.

LEYCESTERIA.

Deciduous shrubs or half shrubs with excavated pith; opposite simple leaves; moderately small gamopetalous perfect flowers in nodding leafy terminal clusters; and small red inferior few-seeded berries.

Leaves ovate or lance-ovate: flowers purplish. L. formosa.

Family COMPOSITAE. Sunflower Family.

The largest family of plants, widespread and of much floricultural value, including the chrysanthemum of florists and many bedding plants: rarely woody. Cocklebur, dog-fennel, dandelion, thistle, white weeds, etc., are familiar examples of composite weeds; and artichoke, oyster-plant and chicory are grown in the garden.

BACCHARIS. Groundsel Tree.

Deciduous shrubs with moderately slender sharply angled twigs with resin-passages in the bark; somewhat angular pale brownish homogeneous pith; alternate somewhat raised shallowly U-shaped 3-lobed leaf-scars with 3 bundle-traces; no stipule-scars; round-ovoid solitary sessile buds, with several scales, heavily coated with resin; simple cuneately stalked toothed leaves; minute perfect gamopetalous flowers in small green-involucrate heads mostly clustered toward the ends of the branches; and minute akenes with long rather tawny pappus.

Leaves oblanceolate or obovate, moderately large. B. halimifolia.

GLOSSARY.

Abruptly pinnate. Pinnate without a terminal leaflet.
Acaulescent. With basal or radical leaves, as in dandelion.
Acrid. Biting to the taste and often blistering the skin.
Acuminate. With "line-of-beauty" curve; contrasted with acute.
Acute. Tapered to the point.
Aerial roots. Those produced above ground, like the braces of Indian corn or the climbing organs of poison ivy, trumpet creeper, etc.
Aggregated. Grouped into a unit, like the partial fruits of a mulberry, the bundle-traces of hickory, etc.
Alternate. As applied to leaves, one at each node. Occasionally (crape myrtle) leaves are both alternate and opposite, and in the desert willow they may be whorled as well.
Anastomosing. Forming a network, as in veins.
Anther. The pollen-sac of a stamen.
Angiosperms. Plants that mature their seeds within the pistil.
Annular. Like a ring.
Annuals. Plants that live for one season only.
Apetalous. Without corolla, but with calyx. When only one set of floral leaves is present it is assumed to be the calyx even though of bright color and delicate texture, as in clematis.
Appressed. Not spreading, as applied to buds, leaves or hairs.
Aril. An appendage of the seed, like that of the bittersweet.
Armed. With spines or prickles.
Aromatic. Fragrantly scented, at least when broken or crushed.
Attenuate. Drawn out into a point, as applied to leaves or scales.
Auricled. With small projections at base (leaf of English oak).
Axil. The angle above a leaf: the point on a stem above the leaf-scar: the angle between two nerves or veins of a leaf.
Axillary. In an axil.
Balsamic. Of the fragrance or consistency of Canada balsam, etc.

Basal, or radical. Leaves that are clustered near the ground.

Berry. A fleshy fruit, usually small.

Bipinnate. Twice, or doubly, pinnate.

Bladdery. Thin-walled and much larger than the seeds (fruit of the bladder-nut).

Blistered. With elevations filled with resin (bark of fir).

Bract. A modified leaf of the inflorescence. Several bracts form an involucre. The seed-scales of cones in Pinaceae are in the axils of bracts.

Branch. One of the coarser divisions of a trunk or main stem: loosely, any division of the stem.

Bristly. With stiff hairs.

Bronzing. Turning bronze- or copper-color.

Bud. The undeveloped end or branch of a stem; usually referring to the stage in which the growing tips pass the winter or dry season; also applied to undeveloped flowers or flower-clusters. Winter-buds are usually scaly or protected by specialized reduced leaves or their parts, but sometimes naked when their outer envelopes develop into leaves in the spring. Though normally one occurs in each leaf-axil, this is accompanied by an accessory bud at each side (collateral) often in oak, silver maple, etc.: or several buds may occur one above the other (superposed) in ash, walnut, Kentucky coffee tree, etc., with the uppermost of the series largest; or in honeysuckle, where the lowermost is largest.

Bunched. Polyadelphous or in several tufts (stamens of linden).

Bundle-traces. The broken ends—as seen on the leaf-scar—of woody strands passing from the stem into a leaf: often simple and definite in number and position (1 in rhododendron, 3 in elm); sometimes broken or aggregated in similarly placed groups (buckeye, hickory), or consolidated in a crescent- or U-shaped or elliptical series (ash); less commonly numerous and irregularly scattered (oak).

Calyx. The outer set of leaves of a flower.

Canescent. Ash-colored, with fine close hairs.

Capsule. A dry dehiscent fruit (rose-of-Sharon, mock-orange).

Carpel. A simple pistil, or one member of a compound pistil.

Carpeting plants. Very low plants, trailing on the ground.

Catkin. The simple elongated flower-cluster of willows, etc.

Chambered. With cavities separated by walls or plates.

Ciliate. Hairy on the margin, like the eyelids.

Clasping. Applied to leaves when their bases grow part-way around the stem, or embrace it by outgrowths.

Class. A natural group of plants consisting of families. The present tendency is to recognize an intermediate assemblage of families, the order. Class names end in *eae*.

Claw. The slender base of a petal like that of carnation.

Clustered. As applied to leaves etc., crowded so as not to be evidently alternate or opposite or whorled on the stem.

Collateral. Standing side by side.

Colored. Usually meaning of some color other than white in flowers and pith, or than green in leaves.

Compound. Of several distinct leaf-like parts or leaflets, as applied to leaves; branched, as applied to the inflorescence; consisting of several in a group, as applied to bundle-traces; of several united carpels, as applied to the pistil.

Cone. The characteristic scaly fruit of pine, hemlock, etc.

Conifer. A member of the Family Coniferae.

Connate. Grown together (ovaries of partridge-berry).

Continuous. Without interruption; applied to pith of elder, for instance, in contrast with that of honeysuckle which is excavated or hollowed out, or that of walnut which is chambered between persistent plates.

Cordate. Heart-shaped.

Corymb. A flat-topped or round-topped flower cluster like that of viburnum.

Crenate. Scalloped, applied to leaves with rounded teeth.

Crenulate. Minutely crenate.

Crisped. Wavy on the margin, like dock leaves; short and curly, when applied to pubescence.

Cryptogams. Flowerless or spore-plants.

Cuneate. Tapering to the base, or wedge-shaped, as applied to leaves.

Cyme. A (frequently flat or convex) flower-cluster with the terminal or central flower of each of its divisions opening first. Many so-called corymbs and panicles are really cymes.

Cymose. In cymes.

Deciduous. Falling in winter, or drying early if remaining attached for a time, as applied to leaves; falling away, like the end-bud of linden, the flower-cluster of lilac, or the calyx of a crab apple.

Decompound. Repeatedly compound.

Decurrent. Continued down the stem in a ridge or wing, as applied to leaves.

Dehiscent. Opening to discharge the seeds, as applied to fruits.

Deliquescent. Breaking up into fine branches (American elm).

Deltoid. Shaped like an equilateral triangle.

Dentate. Toothed; contrasted with serrate or saw-toothed.

Denticulate. Minutely dentate.

Depressed. Shortened, as applied to round or ovoid fruits, etc.

Diaphragms. Firmer plates across the pith, either at the nodes (grape) or at intervals between them (sweet bay, tupelo).

Dicotyledons. Angiosperms with two seed-leaves.

Diffused. The same as scattered, when applied to ducts seen in cross section of wood.

Digitate. Spreading from one point, like the leaflets of a horse-chestnut leaf, the lobes or veins of a maple leaf, etc. When unqualified, it means digitately or palmately compound, if applied to leaves.

Dioecious. Imperfect flowers, the sexes on separate individuals, as in poplar.

Disarticulating. Falling away so as to leave a clean-cut scar, as most leaves and many fruits finally do.

Discoid. The same as chambered, when applied to pith.

Disk. The same as sucker, for tendrils.

Dissected. Divided into numerous narrow lobes.

Divergent. The same as spreading.

Division. One of the main groups under which plants are classified; often called phylum. For the higher plants, the names of divisions end in *phyta*.

Dotted. As here used, referring to the presence of lighter or darker spots or of rather regularly and closely placed blackened hairs or glands, usually on the under side of a leaf.

Double. With more than the normal number of petals, as applied to flowers. Double poinsettias have their bracts increased: double hydrangeas, their neutral flowers.

Downy. Pubescent, with the hairs short, soft and spreading.

Drooping. Hanging from the base so as to suggest wilting, like the leaves of peach and sweet cherry.

Drupe. A "stone-fruit", typically with the outer part succulent and one hard kernel (plum): but the flesh may be thin and dry (almond), or may contain several stones (holly). In a huckleberry the stones are small and seed-like, but their presence is shown by the crackling sound when they are broken between the teeth,—quite different from the behaviour of a blueberry.

Drupelet. A diminutive drupe.

Ducts or vessels. The water-passages in wood: appearing as pores in cross-section. When larger or crowded in the spring-growth, they make the wood "ring-porous" (oak); when uniform in size and disposition, they render it "diffused-porous" (walnut). The smaller ducts are often arranged in flame-like radiating patterns (oak), or wavy tangential patterns (elm).

Dull. Not glossy; not brightly colored.

Ellipsoid. Shaped like a foot-ball, as applied to fruits, etc.

End-bud. The characteristic growing tip of a stem or its branch: sometimes replaced by a flower (magnolia) or cluster of flowers (horse-chestnut) and then not found in winter; and sometime regularly cast off during the growing season (linden) or dying back before winter (willow).

Endogens. Inside-growing plants,—forming new wood, if at all, as new threads between the old (Smilax, palms etc.).

Entire. With the margin neither toothed nor lobed, as applied to leaves and leaflets.

Epigynous. With calyx, corolla and stamens apparently originating from the upper part of the ovary, as in the apple.

Evanescent. Quickly disappearing.

Evergreen. Holding green foliage through the winter.

Excavated. Hollowed between nodes, as applied to pith.

Exfoliating. Peeling away (papery bark of canoe birch).

Falcate. Sickle-shaped, curved to one side.

Family. A natural group of plants comprising one or more genera. Family names are usually derived from the name of one of their genera, and then end in *aceae*.

Fastigiate. With upright branches (Lombardy poplar).

Filiform. Long and slender or thread-like, as applied to twigs, petioles or flower-stalks.

Fissured. Torn lengthwise, as applied to bark or pith.

Flaking. The same as shredding, with shorter fragments.

Flame-shaped. Wavily branching from the pith toward the bark, as applied to duct-pattern of such woods as chestnut and oak, seen in cross-section.

Fleshy or succulent. Employed in contrast with membranaceous, leathery, etc., for leaves: in contrast with hard, for stems in some cases; and in contrast with dry when ripe, for fruits.

Flower-scar. The scar from which a flower has fallen.

Fluted. Ridged lengthwise (sycamore bud, young oak twig).

Foliage sprays. Twigs which finally fall away carrying the small leaves with them; sometimes at end of the first season (bald cypress, tamarisk), sometimes after several years (arbor vitae).

Foliar shoots. The same as foliage sprays.

Follicle. A small dry fruit opening down one edge.

Fusiform. Spindle-shaped: rounded in cross-section and tapered to base and apex.

Gamopetalous. With the petals grown together, as in a morning glory, or at least at the base.

Genus. A natural group of plants comprising one or more species. Generic names of trees ending in *us* are feminine.

Glabrate. Nearly glabrous.

Glabrescent. Becoming glabrous.

Glabrous. Not hairy.

Gland. A secreting organ: as here used, secreting nectar (petiole of cherry), aromatic oil (sweetbrier foliage), or balsam (cottonwood and horse-chestnut buds); sometimes containing resin or essential oils, either on the surface (bayberry) or within the substance of a leaf, etc. (orange).

Glaucous. With a white or bluish bloom, like a plum.

Globose. Shaped like a globe: spherical.

Glutinous. Sticky, with resin or gum.

Granular. Minutely or microscopically roughened.

Gummy. Much the same as resinous, as applied to buds.

Gymnosperms. Naked-seeded flowering plants, like cycads and conifers: contrasted with Angiosperms.

Habit. General appearance, or mode of growth.

Halberd-shaped. The same as hastate.

Hard-wood. Technically, the lumber derived from Angiosperms.

Hastate. Elongated, with two spreading lobes at base (leaves of red sorrel, bracts of blue beech).

Head. A round or flat cluster of sessile flowers.

Herbaceous. Not woody.

Homogeneous. Continuous and without firmer cross-plates or diaphragms, as applied to pith.

Horizontal. With the broad faces parallel to the earth, as applied to the foliage sprays.

Horrid. Used in the classic sense.

Hybrid. Offspring resulting from the egg of one species being fertilized by the sperm of another: less properly, the result of crossing one variety with another. Names of hybrids are prefixed by ×; or a compound name is formed by combination of the specific names of the parents, separated by ×.

Hypanthium. A hollow fruiting receptacle (rose, fig).

Hypogynous. Arising from the receptacle below the pistil, as applied to calyx, corolla or stamens.

Imperfect. Lacking stamens or pistil, as applied to flowers.

Incised. Toothed or lobed, with acute sinuses as if cut.

Indehiscent. Not opening, as applied to fruits.

Inferior. As applied to the ovary of an epigynous flower, with the calyx or other floral parts apparently coming from the top of the ovary (apple, blueberry, etc.).

Inflated. Loose and membranous about the seeds, as applied to fruits.

Inflorescence. The cluster of flowers.

Internode. The part of a stem between two nodes.

Involucrate. With a surrounding cluster of modified leaves, showy in poinsettia, green in sunflower, etc.

Junctures. The same as winter-nodes.

Laciniate. Incised, with narrow divisions.

Lanceolate. Lance-shaped: applied to elongated pointed leaves widest at or somewhere below the middle.

Leaf-cushion. The raised base from which the leaf-stalk finally breaks away, in many Leguminosae etc.

Leaf-scar. The point from which a leaf has fallen: within it may be seen one or more bundle-traces, where the woody strands of the leaf-stalk have been broken—usually at the very base of the petiole, but occasionally above it (flowering dogwood, where the remainder falls later) or within the leaf-cushion (mock-orange, locust), so that the axillary buds are covered by a membrane.

Leaflet. One of the separate parts of a compound leaf.

Legume. The characteristic fruit of the pea family.

Lenticels. The wart-like prominences on the bark of young twigs; very conspicuous on elder etc.; forming long cross-lines on young branches of cherry and paper birch.

Lignified. Woody.

Linear. Narrow and elongated, with nearly parallel sides.

Lobed. Divided rather deeply, as applied to leaves—the segments too long to be called teeth but not separated as leaflets.

Mamillated. With rounded breast-like elevations.

Matted. Growing densely, so as to form a low close cover to the ground, or in very compact tufts.

Medullary rays. The plates radiating from pith to bark in exogenous stems: appearing as lines, sometimes heavy (oak), in cross section.

Megalospores. The large or female spores of fernworts.

Membranaceous. Thin and dry, in contrast with green and leaf-like, as applied to scales or bracts.

-merous. Parted. A suffix used to indicate the number of sepals, petals etc. in the flower; as trimerous (3-merous), tetramerous (4-merous), pentamerous (5-merous).

Microspores. The small or male spores of fernworts.

Midrib. The strong main vein running from base to apex in a pinnately veined leaf, like that of chestnut or apple.

Milky. Colored, usually white, when applied to the sap of trees.

Monadelphous. Stamens united by their lower part into a ring or tube, as in hollyhock.

Monocotyledons. Angiosperms with a single seed-leaf (smilax).

Monoecious. Imperfect flowers, the sexes on one individual (oak).

Monopodial. Continuing the growth from a terminal bud, as applied to twigs: in contrast with sympodial.

Moss-like. Used loosely to indicate a compact or matted habit of growth associated with small overlapping leaves.

Mucilaginous. Exemplified by the bark of slippery elm, the leaves of sassafras, etc., when chewed.

Mucronate. With a short stiff abrupt point.

Mucronulate. Minutely mucronate.

Naked. Without calyx or corolla, as applied to flowers: without specialized protecting scales, as applied to buds.

Nectar-glands. Glands that secrete a sugary fluid; as in many flowers, on the leaf-stalk of the plum, on the calyx of paeony and trumpet-creeper, in the angles between the midrib and principal veins of the lower side of a catalpa leaf, on the teeth of an ailanthus leaf, etc. Ants frequently point the way to them.

Needle. A common name for the phylloid shoot or "leaf" of pines.

Needle-like. Long, slender, and about as thick as broad.

Nerved. Usually applied to leaves or scales when the principal woody bundles in them are prominent and run from the base (palmately) and not from a midrib (pinnately): these are usually called veins in other cases, especially when they anastomose and from a fine network or reticulation.

Neutral. Lacking both stamens and pistil. (flowers of snowball).

Nodding. Bending over: applied to the inflorescence and to flower stalks.

Nodes. The points of the stem from which leaves come: these are alternate when solitary at a node; opposite when two come from a node; and whorled when several come from a node. Fascicled or clustered leaves (barberry) usually come from short axillary branches.

Oblanceolate. Lanceolate, but with the greatest breadth above the middle.

Oblique. Unequal-sided at base (leaves of elm or begonia).

Obliquely opposite. Applied to opposite leaves when one of a pair stands more or less higher on the stem than the other.

Oblong. Relatively longer and narrower than elliptical and with more parallel margins than lanceolate, and much broader than linear, as applied to leaves.

Obovate. Inverted ovate, broadest above the middle.

Obtuse. Blunt, in contrast with acute.

Odd-pinnate. Pinnate with a terminal leaflet.

Opposite. As applied to leaves, two at each node: the successive pairs "decussate", so that the leaves are in four ranks on the stem. Sometimes (buckthorn) the leaves of a pair are separated so as to appear alternate but in four ranks. Plants with whorled leaves (deutzia) frequently have them opposite as well.

Order. A natural group of plants consisting of related genera. Ordinal names usually end in *ales*.

Ovate. Like the longitudinal section of an egg, the greatest width below the middle, as applied to leaves.

Ovoid. Egg-shaped, as applied to solid objects like fruits.

Palmate. The same as digitate.

Panicle. A compound or branched raceme.

Papilionaceous. The sweet-pea type of flower.

Pappus. The plume of a Composite akene (dandelion etc.).

Parted. More deeply divided than lobed, but not compound, as applied to leaves.

Pedicel. The stalk of a flower in a compound inflorescence.

Peeling. Much the same as flaking or shredding.

Pellucid-dotted or glandular. Applied to leaves etc. which contain internal oil-glands (orange, wafer-ash, etc.).

Peltate. Attached to a stalk at some distance from the margin, like the leaf of an Egyptian "lotus", the scales on leaves of the Russian "olive," etc.

Pendent. Hanging, like the cone of spruce: that of fir is erect.

Percurrent. With the main trunk continued through the top, hence usually conical or spire-like (spruce), as applied to trees: in extreme contrast with deliquescent.

Perennials. Plants that live for a number of years.

Perfect. With both stamens and pistil, as applied to flowers.

Pericarp. The outer part of the fruit.

Perigynous. With sepals, petals and stamens around the edge of a cup surrounding but free from the pistil or pistils, as in the cherry and rose: contrasted with epigynous and hypogynous.

Persistent. Not deciduous, as applied to leaves.

Petals. The inner floral leaves, forming the corolla.

Petiole. The leaf-stalk.

Phanerogams. Flowering- or seed-plants.

Phylloid shoots. The foliage of pines; morphologically considered as modified branches of the stem, rather than leaves.

Phylum. The same as division.

Pinnate. Distributed along an axis, like the plume of a feather on the quill (leaflets of an elder leaf, the lobes or veins of an oak leaf, etc.). When unqualified it means pinnately compound, if applied to leaves. When the leaflets of a pinnate leaf are again pinnate, the leaf is bipinnate or twice pinnate. Unequally pinnate or bipinnate leaves vary greatly in their compoundness, often in the same leaf (honey locust).

Pistil. The part of a flower that produces ovules and seeds.

Pistillate. Flowers that have pistils but no stamens.

Pith. The central part of a stem, surrounded by the woody cylinder: usually continuous and of uniform texture, but sometimes with firmer plates or diaphragms at the nodes (grape) or at intervals between them (sour gum, sweet bay); in some genera disappearing or excavated (honeysuckle), or chambered between persistent thin plates (golden bell, walnut).

Placenta. The part of the pistil to which seeds are attached.

Polygamous. With both perfect and imperfect flowers (maple).

Polypetalous. With petals not grown together, as in a rose.

Pome. An apple-fruit, the fleshy pulp crowned by the calyx or other vestiges of the flower, and separated from the seeds by a papery (apple) or bony (red haw) core.

Prickle. A pungent outgrowth of the cortex or bark of a stem, or of the surface of a leaf: contrasted with spines, which are modified forms of leaf or stem.

Prostrate. Low and spreading, as applied to shrubs: trailing.

Puberulent. Minutely pubescent.

Pubescent. With hairs.

Pungent. With sharp hard point.

Raceme. A simple flower-cluster (wild cherry).

Rachis. The axis of a pinnate leaf etc.; sometimes continued as a spine or bristle (pea tree).

Radiate. The same as digitate.

Raised. Lying wholly or in part above the general surface of the twig, as applied to leaf-scars.

Ranks. As applied to leaves, the longitudinal lines on the stem in which foliage is arranged: usually 2, 3, 5 or 8 for alternate leaves; and 4 for opposite or obliquely opposite leaves.

Receptacle. The part of a stem that bears the parts of a flower, or that bears the flowers in a condensed inflorescence like that of sunflower or fig.

Reflexed. Bent downward or backward.

Resin-passages. Intercellular spaces in the wood of conifers: appearing as pores in cross section, and so capable of being mistaken for ducts—which are absent from such wood.

Resinous. With copious resin (wood of pine, buds of fir; etc.).

Reticulate. Netted, like the finer veins of an oak leaf or the ridges on the stone of a hackberry fruit.

Retrorse. Turned backward or downward.

Revolute. With the margin rolled back, as applied to leaves.

Rhombic. Four-sided with the opposed sides parallel, but not rectangular: diamond-shaped.

Ribbed. With longitudinal ridges more prominent than is indicated by striate, and more distinct and clearly isolated than fluted indicates.

Ring-porous. Wood in which each year's layer is marked by large or crowded ducts in the spring growth: contrasted with diffused-porous.

Rugose. Wrinkled.

Salver-shaped. With a slender tube and spreading border, like the corolla of phlox.

Samara. A winged fruit (ash, maple, elm, ailanthus).

Sap. As here used, the fluid that flows from a freshly cut twig or leaf-stalk.

Scale. As usually employed, a reduced leaf: also one of the parts of the cone of the pine etc., or of a winter bud; or of the scurf on a leaf or twig, etc.

Scaly. Detaching in flakes (white oak), as applied to bark: with finally hard and dry sometimes woolly or varnished leaves or stipules, as applied to winter-buds.

Scape. A flower-stalk coming from a cluster of basal leaves (hyacinth).

Scattered. Not in any of the usual definite groups, as applied to leaves, ducts, bundle-traces, etc.

Scrambling plants. Imperfect climbers, lacking aerial roots and tendrils and not twining, but sometimes aided by prickles (rose) or short strong hairs (hop).

Scurfy. With scale-like pubescence rather than hairs.

Seed. The ripened ovule, containing an embryo plant.

Segment. One of the parts of a gamopetalous corolla or gamosepalous calyx: one of the parts of a lobed leaf.

Sepals. The outer, or only, series of floral leaves, constituting the calyx; sometimes (clematis) petal-like.

Seriate. In lines or series, as applied to ducts in cross section of wood.

Serrate. Toothed, with the teeth pointing in one direction like those of a saw: double serrate leaves have such teeth again serrate: contrasted with crenate and dentate.

Serrulate. Very finely serrate.

Sessile. Not stalked.

Shaling. Scaly, in large flakes (bark of shag-bark hickory).

Shredding. Falling away in shreds (bark of the grape vine).

Simple. Of a single leaflet, as applied to leaves: unbranched, as applied to stem or inflorescence.

Single. With the normal number of showy parts, as applied to flowers: contrasted with double.

Sinus. The notch between two lobes.

Smooth. Not roughened: frequently, but less accurately, also used in the sense of glabrous.

Soft-wood. Technically the lumber derived from conifers.

Solitary. Applied to buds when only one occurs at a node: contrasted with the cases in which there are more than one, either collateral or side by side (oak, maple), or superposed one above the other (walnut, honeysuckle).

Spatulate. Oblong with the upper part rather abruptly widened.

Species. A natural group of plants composed of individuals; often comprising several minor forms,—subspecies or varieties. Specific names, when not substantives in apposition (Acer Negundo) or in the genitive (Viburnum Carlesii), agree in number and gender with the name of the genus (Quercus alba, Calycanthus floridus, Viburnum nudum).

Spermatophytes. Seed- or flowering-plants.

Spike. A simple elongated compact cluster of flowers or sporangia.

Spine. A pungent specialized form of the leaf (barberry) or its stipules (locust) or tip (pea tree), or of a twig (hawthorn, wild crab).

Spinescent. Turning into spines, like the stipules of locust.

Sporangium. A spore-case.

Spores. As here used, the dust-like bodies by which flowerless plants or cryptogams are multiplied.

Spreading. Used in contrast with appressed or closely applied to the stem, for some leaves and buds; or to closely applied to the leaf or twig etc., for some hairs.

Spring wood. That formed at the beginning of each year's layer: often marked by the crowding or large size of its ducts, when the wood is spoken of as ring-porous.

Spur. A short- or dwarf-branch of the stem: also applied to a spur-like outgrowth of the flower, the angle of a wistaria leaf-scar, etc.

Spur-scar. The scar from which a dwarf-shoot has fallen (pine).

Stalked. As applied to buds, indicates that the scales are clustered at an observable distance from the point where the bud originates on the stem (alder).

Staminate. Flowers that have stamens but no pistil: male flowers.

Standard. In horticulture, a small tree produced by grafting a low-growing form on a trunk of the desired height.

Star-shaped. With several points rather symmetrically oriented about a common center, as in a sweet-gum leaf and the scales on the leaves of deutzia.

Stellate. The same as star-shaped, when applied to hairs.

Sterigmata. The raised bases from which some small evergreen leaves finally fall (spruce).

Sterile. Not producing fruit,—neutral or staminate, as applied to flowers.

Stipellate. With stipule-like bodies at base of a leaflet.

Stipular. Pertaining to or derived from stipules.

Stipules. The small basal outgrowths of a leaf: sometimes attached to its stalk (rose); occasionally more than 2 (viburnum); exceptionally hardened into spines (locust): usually small or falling early in the season.

Stipule-scars. Scars on the twigs, from which stipules have fallen: sometimes forming a narrow line around the node (magnolia), but usually short and small.

Stomatiferous. Bearing stomata or "breathing pores."

Stone. The hard inner part of a drupe.

Striate. Striped, usually by alternating ridges and grooves.

Style. The prolonged apex of a pistil or carpel.

Sub-. Often used as a prefix in the sense of nearly, as in subglobose, subglabrous, subsessile, submarginal.

Succulent. Fleshy (leaf of aloe or stonecrop, stem of cactus).

Suckers. Adhering disks on tendrils (Boston ivy).

Sulcate. Grooved.

Summer wood. That formed in summer of each year, hence the outer part of the annual layer: often with the fine ducts in a characteristic grouping when seen in cross section.

Sunken. In depressions (buds of button-bush and coffee-tree).

Superposed. One above another (buds of honeysuckle and walnut).

Supra-axillary. Above rather than in the axil.

Sympodial. Continuing the growth by development of an axillary bud and not a terminal bud, either internode after internode (grape), or season after season (elm), as applied to twigs.

Tangential. At right angles to the medullary rays, as applied to the duct pattern of such woods as elm: contrasted with radial.

Tendril. A leaf (clematis) or stem (grape) modified to form a specialized climbing organ.

Terete. Round in cross-section, as applied to twigs etc.

Thorn. The same as spine: a pungent modification of leaf or twig; contrasted with prickles or superficial pungent outgrowths.

Tomentum. Woolly pubescence.

Toothed. With the margin cut in, but not deeply enough for lobing, as applied to leaves.

Torulose. Constricted between swollen parts (fruit of radish).

Tracheae. The same as ducts.

Tracheides. Short wood-cells, replacing ducts or tracheae in conifers as water channels: characteristically marked by microscopic bordered pits, spiral thickening, etc., like the ducts.

Trailing. With elongated stems spreading on the ground.

Translucent. The same as pellucid.

Trifoliolate. Of three leaflets, as applied to compound leaves.

Triple-nerved. With three palmate nerves, or with two strong branches from the lower part of the midrib.

Truncate. Cut off rather abruptly, as applied to base or apex of a leaf.

Trunk. The main stem of a tree.

Tuberculate. Warty with rounded prominences (twigs of elder etc.).

Tubular. Cylindrical, without a spreading border, as applied to calyx or corolla: here used rather loosely.

Turbinate. Top-shaped or inversely conical.

Twigs. The finer or finest branches of a stem.

Twining. Coiling about a support like the stem of morning-glory: some tendrils also twine about supports.

Twinned fruits. Formed from connate ovaries surmounted by separate calyxes and corollas (partridge berry).

Twinned hairs. Characteristic hairs of dogwood; a simple form of stellate pubescence with only two rays, in a straight line.

Umbel. A flat- or round-topped flower-cluster with the stalks rising from one point, as in the carrot.

Unarmed. With neither spines nor prickles. Some herbs and tropical woody plants (nettles) are protected by stinging hairs.

Undershrub. A woody plant forming the ground-covering under or between trees and larger shrubs: here made to include evergreen herbs.

Urceolate. Urn-shaped (flowers of heath).

Valvate. With the edges meeting but not overlapping, as applied to sepals, bud-scales, etc.

Variegated. Striped or margined or mottled with some color other than green, as applied to leaves.

Variety. A subdivision of a species. When written trinomially, as in this book, varietal names that are adjectives agree in number and gender with the generic name: when prefixed by the abbreviation var., they are feminine.

Veins. The woody bundles in a leaf.

Velvety. Essentially the same as downy.

Vernal. The same as spring, as applied to wood.

Vertical. With edges vertical, as applied to foliage-sprays.

Villous. With long spreading hairs.

Vine. A slender-stemmed climbing or trailing plant: classically, the grape vine.

Weeping. Conspicuously drooping or pendent, as applied to branches and twigs.

Whorl. A group of 3 or more branches, flowers, or leaves, coming from one point on the stem. Whorled leaves are frequently found in place of opposite leaves (deutzia, hydrangea), but rarely replace alternate leaves (desert willow).

Winged. With thin border or appendage (fruit of elm or maple, twigs of some species of spindle tree, etc.).

Winter-node. The point at which a winter-bud has existed: usually marked by crowded narrow scars corresponding to the fallen scales after the bud has developed.

Wood-parenchyma. Tissue that accompanies ducts and tracheides in the wood.

Woolly. Pubescent with long curving tangled hairs.

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